FORA ESCA REMEDIATION PROGRAM

FINAL
Addendum to
Final OE-15SEA.1-4 Site-Specific Work Plan

Phase II Seaside
Munitions Response Area (MRA)
Removal Action

Former Fort Ord
Monterey County, California

January 24, 2008

Prepared for:

FORT ORD REUSE AUTHORITY

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WESTON SOLUTIONS

Westcliffe Engineers, Inc.

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FVF SEAMRA-003

ACRONYM LIST

AAR	After-Action Report
ACGIH	American Conference of Governmental Industrial Hygienists
ACM	asbestos-containing material
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
AOC	Administrative Order on Consent
AR	Army Regulation
Army	United States Department of the Army
ASTM	American Society for Testing and Materials
ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
ATV	all-terrain vehicle
BADT	best available (and appropriate) detection technology
BO	biological opinion
BRAC	Base Realignment and Closure
Cal-OSHA	California Occupational Safety and Health Administration
CCR	California Code of Regulations
CDL	Commercial Driver's License
CDR	Covenant Deferral Request
CEHNC	Corps of Engineers - Huntsville Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHOMP	Community Hospital of the Monterey Peninsula
CIH	certified industrial hygienist
CMV	commercial motor vehicle
CPR	cardiopulmonary resuscitation
CSHP	Corporate Safety and Health Program
CSP	Community Safety Plan
CTS	California Tiger Salamander
CWM	Chemical Warfare Material
DA PAM	Department of the Army Pamphlet
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DHS	Department of Health Services
DID	Data Item Description
DMM	discarded military munitions
DOD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DQO	data quality objective
DTSC	Department of Toxic Substances Control

EM	Electro Magnetic
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ESCA	Environmental Services Cooperative Agreement
ESL	Explosive Storage Location
EZ	exclusion zone
FAA	Federal Aviation Administration
FD	Fire Department
FLD	field operating procedure
FORA	Fort Ord Reuse Authority
FVF	field variance form
FWS	U.S. Fish and Wildlife Service
GIP	Geophysical Investigation Plan
GIS	Geographic Information System
GPS	Global Positioning System
GX	Geosoft eXecutable
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B Virus
HC	Hexachloroethane
HEPA	high efficiency particulate air
HMP	Habitat Management Plan
HTW	Hazardous and Toxic Waste
I & T	Inspection and Test Plan
IAW	in accordance with
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
km	kilometers
LBP	lead based paint
LFR	LFR Inc.
m	meter
M&TE	measuring and test equipment
MBUAPCD	Monterey Bay Unified Air Pollution Control District
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram

$\mu g/m^3$	micrograms per cubic meter
mph	miles per hour
MPPEH	material potentially presenting an explosive hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
MSD	minimum separation distance
MSDS	material safety data sheet
mV	millivolt
NAD	North American Datum
NCR	nonconformance report
NESHAP	National Emission Standards for Hazardous Air Pollutants
NEW	net explosive weight
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priorities List
NRMA	natural resources management area
nT	nanoteslas
NTCRA	Non-Time-Critical Removal Action
ODDS	Ordnance Detection and Discrimination Study
OE	Ordnance and Explosives
OESAP	OE Sampling and Analysis Plan
OSHA	California Occupational Safety and Health Administration
OSIC	On Scene Incident Commander
PDA	personal digital assistant
PDOP	positional dilution of precision
PEL	permissible exposure limit
PHSM	Project Health and Safety Manager
PM	Project Manager
POM	Presidio of Monterey
PPE	personal protective equipment
PWP	Programmatic Work Plan
QA	quality assurance
QC	quality control
QCM	Quality Control Manager
QCP	Quality Control Plan
RAWS	remote automated weather station
RI/FS	Remedial Investigation and Feasibility Study
RMSF	Rocky Mountain Spotted Fever
RPM	Remediation Project Manager
RTK	real-time kinematic

SCA	Special Case Area
SCBA	self-contained breathing apparatus
SCRM	site closure, restoration, and monitoring
SOP	standard operating procedure
SSHP	Site Safety and Health Plan
SSWP	Site-Specific Work Plan
SUXOS	Senior UXO Supervisor
SWP	safe work practice
TCRA	Time-Critical Removal Action
TDEM	time-domain electromagnetic
TDMD	time-domain metal detector
TEU	Technical Escort Unit
TIP	Technical Information Paper
TLV	threshold limit value
USA	Underground Service Alert
USACE	U.S. Army Corps of Engineers
USACE EM	U.S. Army Corps of Engineers Engineering Manual
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
Westcliffe	Westcliffe Engineers, Inc.
WESTON	Weston Solutions, Inc.
WP	white phosphorous

GLOSSARY

Covenant Deferral Request

A letter along with a supporting information package known as a Covenant Deferral Request (CDR) is assembled by the Federal landholding to formally request deferral of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) covenant until all remediation has been accomplished prior to transfer. U.S. Environmental Protection Agency (EPA) requires that the information is: 1) of sufficient quality and quantity to support the request for deferral of the CERCLA Covenant; and 2) that it provides a basis for EPA to make its determination. This information is submitted to EPA in the form of a CDR.

Deferral period

The period of time that the CERCLA covenant warranting that all remedial action is complete before transfer, is deferred through the Early Transfer Authority.

Early Transfers

The transfer by deed of federal property by U.S. Department of Defense (DOD) to a nonfederal entity before all remedial actions on the property have been taken. Section 120 (h)(3)(C) of the CERCLA allows Federal agencies to transfer property before all necessary cleanup actions have been taken. This provision, known as early transfer authority, authorizes the deferral of the CERCLA covenant when the findings required by the statute can be made and the response action assurances required by the statute are given. The Governor of the state where the property is located must concur with the deferral request for property not listed on the National Priorities List (NPL). For NPL property, the deferral must be provided by the EPA with the concurrence of the Governor. Upon approval to defer the covenant, DOD may proceed with the early transfer.

Construction Support - Assistance provided by DOD Explosive Ordnance Disposal or unexploded ordnance (UXO) qualified personnel and/or by personnel trained and qualified for operations involving chemical agent, regardless of configuration, during intrusive construction activities on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or chemical agent, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive or chemical agent hazards.

Discarded Military Munitions (DMM)

Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include UXO, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

Exclusion Zone
A safety zone established around an MEC work area. Only project personnel and authorized, escorted visitors are allowed within the exclusion zone. Examples of exclusion zones are safety zones around MEC intrusive activities and safety zones where MEC is intentionally detonated.

Geophysical Reacquisition
Geophysical Reacquisition involves utilizing both a positioning method (i.e., Global Positioning System [GPS], ultrasonic, or tape from corners) and geophysical instruments to reacquire and pinpoint anomaly locations selected by the geophysical processors. The geophysical instruments include the original instrument used for the digital survey of the grid and the analog instrument being utilized by the UXO teams for intrusive activities. The intended result of this method is to pinpoint the location where the intrusive teams will find the subsurface item causing the anomaly.

LFR Team
LFR Inc., Weston Solutions, Inc., and Westcliffe Engineers Inc.

mag and dig
Utilizing hand held geophysical instruments to detect anomalies and investigating the anomalies by manual digging or with the assistance of heavy equipment

Material Potentially Presenting an Explosive Hazard (MPPEH)
Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DOD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Military Munitions
All Ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after

all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4)(A through C)).

Military Munitions Response Program
Department of Defense-established program that manages the environmental, health and safety issues presented by munitions of explosives concern.

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

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

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

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

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

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

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

Ordnance and Explosives (OE)
See MEC.

shape charges
small conical explosive charges used to vent or detonate munitions of concern

Special Case Areas (SCAs)
SCAs were identified by the Army for a variety of reasons, such as dense metallic clutter that prevented digital detection instruments or interference due to nearby metal structure

or features. SCAs include historical and current fencing; asphalt/concrete range pads, roads, and walkways; areas under existing structures (i.e., field latrines and range-related structures); berms and culverts; and areas requiring excavation by heavy equipment (i.e., scrape areas).

Small Arms Ammunition (SAA)

Ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns.

Unexploded Ordnance (UXO)

Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)(A) through (C))

UXO Technicians

Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.

EXECUTIVE SUMMARY

Introduction and Purpose

This Seaside Munitions Response Area (MRA) Site-Specific Work Plan (SSWP) Addendum describes the procedures, methods, and resources that will be used to complete the field activities associated with the United States Department of the Army's (Army's) munitions response at the Seaside MRA at the former Fort Ord in Monterey County, California. The work defined in this plan will be referred to as the Phase II Seaside MRA Removal Action.

The objective of this removal action is to reduce the threat to human health (public safety) posed by the presence of munitions and explosives of concern (MEC) at the Seaside MRA. The Phase II Removal Action will include completion of MEC removal in the sites identified by the Army as Special Case Areas (SCAs). This removal action will continue to prepare the site for reuse and collect additional data to fill data gaps to support a Remedial Investigation and Feasibility Study. In addition, this work will provide an additional measure of safety within the alignments of General Jim Moore Boulevard and Eucalyptus Road.

The work to be performed during this Phase II Seaside MRA Removal Action will be conducted in general accordance with the procedures specified in the Final Site-Specific Work Plan for the Ordnance and Explosives (OE) Cleanup, Final OE-15SEA.1-4, prepared by Parsons Inc. for the U.S. Army Corps of Engineers, Sacramento District, in March 2002 [Ref. 21].[1] This SSWP addendum also supplements the Military Munitions Response Program, Programmatic Work Plan (PWP) for former Fort Ord, Monterey County, prepared by Parsons Inc. for the U.S. Army Corps of Engineers (USACE), Sacramento District, in 2001 and updated in 2004 [Ref.1].

The Seaside MRA includes USACE parcels E24, E34, E23.1, and E23.2, which are roughly coincident with the following Munitions Response Sites (MRSs): MRS-15SEA.1, MRS-15SEA.2, MRS-15SEA.3, and MRS-15SEA.4, respectively.

Previous Investigation and Removal Activities

From 1997 to 2001, the Army performed sampling and removal investigations on the Seaside munitions response sites (MRS-15SEA.1–4). During these investigations, MEC items were removed from the site including Stokes trench mortars, 60mm mortars, 75mm projectiles, and hand grenade fuzes.

[1] *The name of the site changed to MRS-15SEA.1-4 after the work plan was published.*

To address the imminent threat from munitions hazards the Army conducted the following major munitions response actions on the Seaside MRA:

1. The Time-Critical Removal Action (TCRA), which entailed vegetation clearance operations and a surface removal of MEC.

2. The Non-Time-Critical Removal Action (NTCRA), which entailed a 4-foot removal (to depth). Following an expansion protocol, portions of the site were added to the Notice of Intent removal areas. This action was based on the presence of MEC or fragments in grids along the interior edge of the removal areas.

These actions were completed in 2004 with the exception of approximately 35 acres of SCAs. SCAs were identified by the Army for a variety of reasons, such as dense metallic clutter that prevented digital detection instruments or interference due to nearby metal structure or features. SCAs include historical and current fencing; asphalt/concrete range pads, roads, and walkways; areas under existing structures (i.e., field latrines and range-related structures); berms and culverts; and areas requiring excavation by heavy equipment (i.e., scrape areas).

The NTCRA was performed pursuant to site-specific and programmatic work plans. The PWP [Ref.1] was prepared in May 2001 with updates in May 2004 and describes the procedures, methods, and resources used while performing munitions response work at the former Fort Ord. In March 2002, Parsons Inc. prepared a SSWP for munitions response actions in MRS-15SEA.1-4. An addendum to the March 2002 SSWP was issued in December 2002, to include the previously excluded 25-acre eastern portion of MRS-15SEA.4. These documents are available on the Army's administrative record, which can be found at www.fortordcleanup.com, or at the Fort Ord Base Realignment and Closure (BRAC) office.

Environmental Services Cooperative Agreement

On March 31, 2007, the Army and the Fort Ord Reuse Authority (FORA) entered into an Environmental Services Cooperative Agreement (ESCA) thereby allowing the Army to transfer approximately 3,380 acres of property and the responsibility of removing MEC to FORA as an Economic Development Conveyance. In accordance with the ESCA, FORA is responsible for addressing all response actions for the property except for those that the Army has retained. FORA, through their contractors, will complete the Army's munitions response actions, which is identified as FORA ESCA Remediation Program. The Phase II Seaside MRA Removal Action as defined in this SSWP Addendum will be completed under the ESCA Remediation Program.

1.0 INTRODUCTION

1.1 General

This Seaside Munitions Response Area (MRA) Site-Specific Work Plan (SSWP) Addendum describes the procedures, methods, and resources that will be used to complete the field activities associated with the United States Department of the Army's (Army's) munitions response at the Seaside MRA at the former Fort Ord in Monterey County, California. As contractors to the Fort Ord Reuse Authority (FORA), this work will be performed by LFR Inc. (LFR), Weston Solutions, Inc. (WESTON), Westcliffe Engineers Inc. (Westcliffe; collectively, "the LFR Team"), and their subcontractors. The work defined in this plan will be referred to as the Phase II Seaside MRA Removal Action.

1.2 Regulatory History

On March 31, 2007, the Army and FORA entered into an Environmental Services Cooperative Agreement (ESCA) thereby allowing the Army to transfer approximately 3,380 acres of property to FORA as an Economic Development Conveyance. In accordance with the ESCA, FORA is responsible for addressing all response actions for the property except for those responsibilities retained by the Army. To accomplish this effort, FORA entered into an agreement with LFR, teamed with WESTON and Westcliffe, to assist in the completion of the munitions and explosives of concern (MEC) remediation activities on the 3,380 acres in accordance with the ESCA and an Administrative Order on Consent (AOC).

The AOC was entered into voluntarily by the FORA, United States Environmental Protection Agency (EPA) Region 9, the Department of Toxic Substances Control (DTSC), and the U.S. Department of Justice Environment and Natural Resources Division on December 20, 2006 (U.S. EPA Region 9 CERCLA Docket No. R9-2007-03). The AOC was issued under the authority vested in the President of the United States by Sections 104, 106, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §§ 9604, 9606, and 9622.

FORA, through the LFR Team, will complete the Army's munitions response actions, in a program hereinafter identified as the FORA ESCA Remediation Program. The Phase II Seaside MRA Removal Action as defined in this SSWP Addendum will be completed under the ESCA Remediation Program.

1.3 Site Location

The Seaside MRA is located in the southwestern portion of the former Fort Ord, bordered by the City of Seaside to the west and the impact area to the east. The Seaside MRA runs along General Jim Moore Boulevard south of Eucalyptus Road and is wholly contained within the jurisdictional boundaries of the City of Seaside. Figure 1-1 displays where the Seaside MRA is located in the former Fort Ord, and Figure 1-2 shows the proximity of the MRA to the City of Seaside.

The Seaside MRA includes the U.S. Army Corps of Engineers (USACE) reuse parcels E24, E34, E23.1, and E23.2, which are roughly coincident with (and include all of) MRS-15SEA.1, MRS-15SEA.2, MRS-15SEA.3, and MRS-15SEA.4, respectively. The MRS-15SEA.1–4 nomenclature will be used in this document to refer to the four Munitions Response Sites (MRSs) within the Seaside MRA.

1.4 Purpose

The purpose of this SSWP Addendum is to define the procedures, methods, and resources that will be used to complete the Phase II Seaside MRA Removal Action. The objective of this removal action is to reduce the threat to human health (public safety) posed by the potential presence of MEC items in the Seaside MRA. MEC items potentially present at the Seaside MRA include unexploded ordnance (UXO) and discarded military munitions (DMM).

Data collected during the Phase II Seaside MRA Removal Action will be used to fill data gaps to support a Remedial Investigation and Feasibility Study (RI/FS) for the Seaside MRA. A final remedy will be selected based on the RI/FS and will be documented in an Army record of decision.

1.5 Scope

This SSWP Addendum is a second addendum to the former Fort Ord, Monterey, California Ordnance and Explosives (OE) Cleanup, Final OE-15SEA.1-4[2] Site-Specific Work Plan, prepared by Parsons Inc. for the U.S. Army Corps of Engineers, Sacramento District, dated March 2002 [Ref. 21]. The first addendum to the Parsons Work Plan, was dated December 2002, and documented the work to be completed in the 25-acre Eastern Portion of MRS-15SEA.4 [Ref. 22]. This SSWP Addendum references portions of the Military Munitions Response Program, Programmatic Work Plan (PWP) for former Fort Ord, Monterey County, prepared by Parsons Inc. for the U.S. Army Corps of Engineers, Sacramento District, in 2001 and updated in 2004 [Ref. 1].

[2] *The name of the site changed to MRS-15SEA.1-4 after the work plan was published.*

This SSWP Addendum was prepared to address areas within the Seaside MRA where the Army did not complete the planned removal actions as listed in their Notice of Intent [Ref. 2] to perform a removal action at the Seaside MRA. The Army did not complete their removal action on approximately 35 acres of the MRA referred to as Special Case Areas (SCAs). The location and type of each SCA are shown on Maps A-1 through A-5 presented in Appendix A.

The Phase II Seaside MRA Removal Action will include completion of MEC removals in the SCAs, filling data gaps to support an RI/FS, and a visual surface inspection for MEC along the proposed new roadway alignments for General Jim Moore Boulevard and Eucalyptus Road. Any significant deviation from this plan requires the prior approval of the EPA and DTSC, and completion of a field variance form (FVF) [Ref. 1, Appendix D].

1.6 Document Structure

This SSWP Addendum is presented in numbered sections, tables, figures, and lettered appendices. Tables and figures as referenced in the sections are numbered to correspond with the section that they appear in. Section 6.0 is an exception to the defined document structure as it has been created to be a stand alone document, and therefore its figures and tables are included within the section.

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2.0 TECHNICAL MANAGEMENT PLAN

This SSWP Addendum outlines the procedures that the LFR Team and its subcontractors will use during the Phase II Seaside MRA Removal Action. The topics that remain unchanged from the PWP [Ref. 1] are referenced and briefly summarized in this SSWP Addendum, but are not repeated in this addendum. Updates to the PWP are included in this SSWP Addendum. Sections 3.0, 4.0, 5.0, and 11.0 include relevant sections and information from the PWP, the Final Technical Information Paper (TIP) MRS-SEA.1-4 Time-Critical Removal Action and Phase I Geophysical Operations dated February 11, 2006 (Final TIP MRS-SEA.1-4) [Ref. 18], and previous SSWPs.

2.1 MEC History of Seaside MRA

The information included in this SSWP Addendum is based on historical documents and previous MEC sampling and removal activities in the Seaside MRA. The Seaside MRA contains portions of ranges that were used for military training activities. The Final TIP MRS-SEA.1-4 [Ref. 18] summarizes the previous MEC removal and sampling activities that were performed in the Seaside MRA. Appendix B of this SSWP Addendum lists the MEC that were encountered during the previous MEC removal and sampling activities.

2.2 Field Operations and Removal Areas

Seaside MRA field operations include completing work within SCAs and the roadway alignment. Appendix A maps show the locations of SCAs and the roadway alignment. Field operations to be completed are described below.

2.2.1 Special Case Areas

SCAs were identified by the Army for a variety of reasons, such as dense metallic clutter that prevented digital detection instruments or interference due to nearby metal structure or features. SCAs include historical and current fencing; asphalt/concrete range pads, roads, and walkways; areas under existing structures (i.e., field latrines and range-related structures); berms and culverts; and areas requiring excavation by heavy equipment (i.e., scrape areas). The removal action technical approach for each type of SCA is listed in the following subsections.

2.2.1.1 Existing Site Fence Area

The metallic site fence along General Jim Moore Boulevard/Eucalyptus Road interfered with the geophysical instruments. In addition, the metallic chain-link range gates blocking the access roads into the sites affected the immediate areas surrounding them. The fence and gates along General Jim Moore Boulevard/Eucalyptus Road will be removed and areas 25 feet inside the western and northern site boundaries and the immediate areas surrounding the range gates will be cleared to depth using best available detection technology (BADT) as defined Section 5.0 of this SSWP Addendum.

2.2.1.2 Original Fence Line

The original fence line area is located 10 to 15 feet inside MRS-15SEA.1–3 (east of General Jim Moore Boulevard). The original concertina wire fence was removed and electromagnetic operations were performed over the area in an attempt to collect metallic debris. After electromagnetic operations, digital instrument response in the immediate area adjacent to the original fence line was saturated. As a result, this area could not be geophysically surveyed. An approximately 25-foot-wide area adjacent to the original fence line will be scraped to remove magnetic interference. The original fence line SCA will be cleared to depth using BADT. The spoils from the scraping operation will be sifted and stockpiled on site.

2.2.1.3 Asphalt and Concrete

Asphalt range roads extend from General Jim Moore Boulevard and Eucalyptus Road into Seaside MRA. There are additional asphalt-covered areas, including parking and staging areas. There are also several range structures (e.g., range towers, break areas) on top of the asphalt and culverts in the subsurface near the asphalt roads. The structures will be removed and the culverts excavated with heavy equipment. The asphalt roads and pads will also be removed and the area cleared to depth using BADT.

2.2.1.4 Backhoe Excavations

There are approximately 350 locations/areas that require backhoe excavations. These include areas where backhoe excavations were started but not completed due to budgetary constraints and areas containing buried cable/wire, grounding rods, range markers, reinforced concrete, and wood. Backhoe excavations will be performed at these locations and the areas will be cleared to depth using BADT.

2.2.1.5 Heavy Equipment Excavations

There are approximately 40 locations that require excavation with heavy equipment. These include concrete bunkers, fighting positions, flag poles, target boxes, tie downs, utility poles, and wooden stairs. These locations will be excavated with heavy equipment and the areas will be cleared to depth using BADT.

2.2.1.6 Berms

There are several berms in the Seaside MRA, some of which are reinforced with wooden retaining walls. The metal connectors of the retaining walls prevented geophysical surveys from being conducted in some of the areas near the berms, and the material in the berms is too thick to effectively detect MEC at or below the original ground surface. The retaining walls will be removed and the berms will be deconstructed. Heavy equipment will be used to remove soil from the berm, with construction support, until a surveyor determines that the level of the berm matches the existing terrain or that the native soil

levels have been reached. Once this determination has been made, the scraped surface will be cleared to depth using BADT. The soil from the berms will be sifted and stockpiled on site.

2.2.1.7 Structures

There are several structures and latrines in the Seaside MRA. The surface beneath the structures and latrines was inaccessible during previous removal actions in the Seaside MRA and the immediate areas around these buildings could not be surveyed because of interference. The structures and latrines will be removed. The uncovered areas and the affected areas around the structures and latrines will be cleared to depth using BADT in accordance with the latrine clearance standard operating procedure (SOP) in the PWP [Ref.1, Appendix G].

2.2.1.8 Range 46 Remote Automated Weather Station

A remote automated weather station (RAWS) was situated on Range 46 during previous Seaside work and has since been removed. The ground surface underneath this RAWS was inaccessible, and the immediate areas around the RAWS could not be surveyed because of interference. These areas will be cleared to depth using BADT.

2.2.1.9 Debris Piles

Numerous locations where debris was piled were inaccessible to the geophysical operations during previous removal actions. The scrap piles will be removed and their locations will be cleared to depth using BADT.

2.2.2 Roadway Alignment

The roadway alignment is identified as the area 50 feet on either side of and including the limits of grading for the new roadway corridors of General Jim Moore Boulevard and Eucalyptus Road (Figure 1-2). MEC removal has been completed within the roadway alignment with the exception of the SCAs and areas west of the current General Jim Moore Boulevard paved area. SCAs will be addressed as described in Section 2.2.1.

The LFR Team will expand the Army's 100 percent digital geophysical survey for MRS-15SEA.1-4 by geophysically mapping and investigating anomalies in the hillside west of General Jim Moore Boulevard. This investigation is being conducted to fill a data gap to support completion of the RI.

In addition, the following actions will be taken to facilitate roadway construction:

- Vegetation removal
- Scraping approximately 6 inches of surface soil

- Stockpiling scraped soil
- Visual surface inspection for MEC within the roadway alignment will be performed as part of construction oversight.

2.3 Site Activities

Figure 2-1 demonstrates the process flow of site activities. These activities will be conducted across the Seaside MRA in parallel to preliminary roadway activities. All field operations and data will be documented in an After-Action Report (AAR). The AAR will be used to support a determination that the alignment is acceptable for use as a roadway.

2.3.1 Site Preparation

The following activities will be conducted to prepare the MRA in advance of removal actions:

- Survey and staking activities
- Preparatory inspection
- Fence installation and removal
- Debris, structure, asphalt, and concrete removal
- SCA boundary delineation
- Vegetation cutting and/or removal

2.3.1.1 Preparatory Inspection

A preparatory inspection of the MRA will be performed before any operations begin, as identified in Section 2.2 of the PWP [Ref. 1]. Some boundary survey work may need to be conducted prior to the formal preparatory inspection.

The purpose of this inspection is to determine what site preparatory measures are needed. This preparatory inspection is also used to identify any environmentally sensitive areas, degree of vegetation present, metallic munitions debris (MD)/scrap levels, and restoration requirements. Site preparation activities will be executed before MEC removal field operations can begin and include boundary staking, vegetation removal, removal of asphalt roads, range residue, or other material that would interfere with geophysical survey operations. The persons attending this inspection will be the Remediation Project Manager (RPM), Senior UXO Supervisor (SUXOS), UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), and the Field Biologist. This inspection will be documented by the UXOQCS.

2.3.1.2 Fence Removal and Installation

The LFR Team will conduct fence installation and fence removal activities. This will include installing a four-strand barbed wire fence with concertina wire along the eastern boundary of MRS-15SEA.1-4 and removing the four-strand barbed wire fence along General Jim Moore Boulevard and Eucalyptus Road. Fence installation will be completed as part of the site preparation activities. Fence removal activities will be conducted along with the SCA removal actions. Interim fencing measures will be implemented as necessary to limit access to the SCA prior to the removal action.

Fencing will be installed along the eastern boundary of the Seaside MRA, 3 feet off the boundary. The fencing specifications are based on Army Specifications for barbed wire fencing (Spec No. 9705, Section 02832). The fencing will include four-strand galvanized barbed wire with posts every 10 feet and pole posts every 500 feet. Appropriate signage will be posted along perimeter fencing. As an additional measure to restrict public access, concertina wire coils will be attached to the barbed wire fencing on the eastern side. To allow for access to the inland range, five 25-foot wide swing gates with posts and concertina wire on top will also be installed. Gates and perimeter fencing requirements will be coordinated with Presidio of Monterey (POM) Fire Department (FD).

2.3.1.3 Debris, Asphalt, Concrete, and Structure Removal

Debris piles, asphalt areas, and concrete pads SCAs will be appropriately removed and managed. Asphalt will be removed with heavy equipment in advance of digital geophysical mapping (DGM) operations. Recycling opportunities will be evaluated as field operations are initiated. Disposal vehicles will be equipped with dust covers.

A number of structures are identified on the Seaside MRA that will be demolished in order to accommodate the removal activities. A variety of range support structures exist within the Seaside MRA. The Army performed preliminary asbestos surveys in 1993 and identified the presence of asbestos-containing materials (ACM) in some of the structures. A description of the pre-demolition sampling program, demolition activities, and post-demolition clearance criteria is presented in Appendix C.

The LFR Team will perform the appropriate testing and demolition activities to complete the removal of the site structures. Work will be conducted in accordance with federal, state, and local regulations regarding building demolition and asbestos abatement as identified in Appendix C. A demolition contractor using California Occupational Safety and Health Administration (OSHA) awareness-trained workers will demolish and dispose of the site structures and associated foundations.

2.3.1.4 SCA Boundary Surveys

Once the preparatory inspection is completed, boundaries will be established for the SCAs and roadway alignment with survey markers. The SCA boundaries will be staked in the field based on the coordinates as reported in the Army's Geographic Information System (GIS) and associated databases. In all cases, the surveyor will be accompanied by

a UXO Technician II who will provide escort in the MRA. In addition, the UXO Technician II will check the area, using a Schonstedt GA52Cx, before any intrusive activities are conducted, such as placing survey stakes.

If additional boundary surveys are required, the survey work will be performed in accordance with surveying procedures defined in detail in Chapter 7 of the PWP [Ref. 1]. All survey work on the MRA will be based on established monuments. The coordinate system to be used for control points and other survey activities is North American Datum (NAD) 83 California State Plane Zone IV. All control points used for base lines meet the standards established by the Federal Geodetic Control Committee for Third Order, Class 1 survey as published in the "Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys" (September 1984) and "Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys" (1980). All control points recovered and/or established at the site will be plotted on planimetric drawings at the appropriate coordinate location and will be identified by name or number. The final adjusted coordinates will be shown, and a tabulated master list of all points will be provided. Copies of all field books, layout sheets, computation sheets, abstracts, and computer printouts will be maintained for inclusion in the AAR.

2.3.1.5 Vegetation Removal

Vegetation will be removed from the work sites to enable the analog or digital geophysical survey teams to thoroughly search the work areas. Subcontracted brush removal teams working with a UXO Technician II will conduct vegetation removals utilizing manual brush cutting and mechanical vegetation removal equipment. Vegetation will be cut in accordance with procedures defined in Chapter 2 of the PWP [Ref. 1].

Manual brush cutting teams will work under the direction of the SUXOS and in coordination with the Field Biologist. Each brush crew (normally consisting of five laborers) has a UXO Technician II for MEC avoidance purposes. A magnetometer is used to aid in searching the vegetation for surface MEC before cutting or removing brush. The amount of brush removal required depends on the terrain and the amount of access required for conducting work and maintaining safety. Any surface MEC encountered by the brush team is marked with a red pin flag and left in place, and notification to the SUXOS is made.

The manual brush cutting teams will be equipped with power chippers, powered weed cutters, chainsaws, and a variety of hand tools. Each brush cutting team will have a leader or foreman that will ensure that personnel engaged in brush cutting activities wear personal protective equipment (PPE) and accessories appropriate for the equipment being operated (e.g., chainsaw chaps).

Mechanical vegetation removal is accomplished when environmental concerns and terrain permit. A brush team (comprised of the equipment operator and a UXO Technician II, who will assist in MEC avoidance) will conduct the operation under the supervision of a Brush Foreman. Mechanical brush removal may be accomplished using

a Bobcat, with a rotary brush-clearing machine or a large-scale removal machine, such as the TAZ, Hydro-Ax, and Brontosaurus, or any newly developed equipment, once it has been approved for use.

Within the SCAs, brush and vegetation will be cut to a level that enables reliable anomaly detection. The preferred distance from ground level is 6 inches for both manual and mechanical brush cutting. Within some of the SCA, brush root mass and tree removal will be required to facilitate the removal activities associated with the SCA (i.e., scrape areas, sifting operation, berms, etc.). These subsurface activities will be conducted by WESTON with oversight by the LFR Team Field Biologist in accordance with the Habitat Management Plan (HMP) [Ref. 17] and Section 12 of this SSWP Addendum.

Within the roadway alignment, the vegetation removal activities will involve brush cutting followed by root mass and tree removal. Roadway vegetation removal activities will be performed by the LFR Team with detailed coordinated with FORA and their Environmental Consultant. FORA's Environmental Consultant will provide biological field oversight during vegetation removal activities within the roadway alignment. These activities will be conducted in conformance with the Environmental Assessment (EA)/Initial Study (IS) for General Jim Moore Boulevard/ Eucalyptus Road Improvement Project prepared for FORA by Pacific Municipal Consultants and Creegan and D'Angelo Consulting Engineers, March 2005 [Ref. 23] and the Administrative Addendum to the General Jim Moore Boulevard/ Eucalyptus Road Improvement Project, Environmental Assessment (EA)/Initial Study (IS), prepared for FORA by Pacific Municipal Consultants, July 2, 2007 [Ref. 24].

For SCAs that lie within the roadway alignment, subsurface activities such as root mass removal will be performed by WESTON with oversight by the LFR Team Field Biologist in accordance with the HMP and Section 12 of this SSWP Addendum.

2.3.2 SCA Removal and Soil Sifting

The removal of MEC from SCAs may include excavations and sifting of affected soil. A final screen size of 1 inch or smaller will be used for sifting operations. Such operations will be conducted in accordance with HNC-ED-CS-S-96-8 to protect equipment operators from MEC hazards while excavating and sifting material. This directive outlines barricades to be used to protect personnel from blast and fragmentation while operating equipment within an MEC site. The depth of the barricades will be determined by the MEC expected to be encountered in the SCAs.

The K24 distance will be maintained between the sifting plant operator and the sifting plant machinery. The maximum fragmentation distance will be maintained between the sifting operations and all nonessential personnel. Soil sifting will begin after approval of the Explosive Safety Submission.

2.3.3 Digital Geophysical Mapping (DGM) Surveys

Following removal of the SCA obstructions that prevent effective geophysical surveys, a DGM survey will be performed within the SCAs to establish and record the locations of geophysical anomalies that could potentially represent subsurface MEC. The digital geophysical survey methodology is detailed in the Geophysical Investigation Plan (GIP) - Section 5 of this SSWP Addendum.

The objective of the geophysical survey is to accurately locate and record the locations of geophysical anomalies that potentially represent MEC in the subsurface. The geophysical survey will be conducted in accordance with Section 5 of this SSWP Addendum, the findings of the Parsons/USA Ordnance Detection and Discrimination Study (ODDS) [Ref. 14], results of the site-specific geophysical prove-out, and lessons learned from previous removal actions at the site.

The BADT will be utilized as appropriate for each area and physical investigation. The performance goal for the geophysical survey is to locate all items in the subsurface that can be detected given the particular instrument and the site-specific conditions (terrain, vegetation, cultural).

Based on previous removal actions, three geophysical instruments represent BADT for this action (two digital and one analog), which use two different geophysical methods (time-domain electromagnetic [TDEM] and magnetics). Instrument descriptions can be found in Section 5.16.1 of this SSWP Addendum. The two digital geophysical instruments that will be used are the Geonics EM61-MK2 time-domain metal detector (TDMD) and the Geometrics G-858 digital magnetometer; both digital geophysical instruments record data. The one analog instrument that will be used is the Schonstedt GA-52/Cx magnetic gradiometer, which will be used for “mag and dig” operations.

2.3.4 Digital Geophysical Anomaly Reacquisition

After DGM data are processed, anomaly targets will be reacquired for excavation. Following the evaluation of geophysical data, the Project Geophysicist will prepare target lists with suspect anomaly locations for reacquisition teams. Reacquisition teams use Global Positioning System (GPS) survey instruments to reacquire the anomaly location. A nonmetallic flag marked with the anomaly identification number will be placed at the anomaly coordinates. A sweep will be conducted by a trained equipment operator within a 3-foot radius of the location using the original geophysical survey instrument. If the anomaly is detected, it will be noted on the anomaly list as such and a static reading will be collected where possible. The reacquisition team will move the flag to the approximate location of the anomaly, and the distance and direction the flag was moved will be recorded on the anomaly list. If no anomaly is detected, the reacquisition team will note the negative result on the anomaly list and leave the flag in the original location. A full description of the digital geophysical reacquisition tasks is located in Section 5.24 of this SSWP Addendum.

2.3.5 Excavation of DGM Anomaly Targets

All subsurface anomalies will be excavated, recorded, and removed, or detonated utilizing the procedures summarized below. UXO Teams are normally composed of a UXO Team Leader and up to a maximum of six UXO Technicians. UXO Teams will perform all intrusive operations and operate under the direct supervision of a SUXOS. A UXOSO will closely monitor the safety of the UXO Teams.

The Department of Defense Explosives Safety Board's (DDESB's) Technical Paper No. 18, "Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel," dated 20 December 2005 [Ref. 20], identifies the various UXO-related positions, and outlines their duties and responsibilities. Based on this technical paper, only personnel qualified as a UXO Technician II (at a minimum) will escort personnel who are not directly involved in UXO-related operations (e.g., personnel performing environmental monitoring), but have activities to perform within exclusion areas.

2.3.5.1 Analog Magnetometer Searches

Schonstedt magnetometer sweeps, i.e., "mag and dig," are particularly effective in areas where vegetation and terrain limit the use of larger digital systems. "Mag and dig" approaches will also be used when there is insufficient difference between MEC at the site and other metallic fragments and debris, such that digital discrimination is ineffective.

The UXO Team Leader will direct personnel to establish individual search lanes approximately 3 feet wide and to begin searching each lane using a Schonstedt Model GA-52/CX magnetometer. UXO Technicians will start at one end of each lane and move forward toward the opposing base line. During the forward movement, the technician will move the magnetometer back and forth from one side of the lane to the other. Both forward movement and the swing of the magnetometer are performed at a pace that ensures that the entire lane is searched and that the instrument is able to appropriately respond to subsurface anomalies. Whenever a subsurface anomaly or metallic surface object is encountered, the technician will halt and investigate the anomaly. Throughout this operation, the UXO Team Leader will closely monitor individual performance to ensure these procedures are being performed with due diligence and attention to detail.

2.3.5.2 Excavation of Digitally Acquired Anomalies

The intrusive investigation teams will be provided with the appropriate digital forms to fill in relevant data related to their intrusive investigation and to excavate all anomaly targets. Annotations for MEC and MD that can be positively identified will include site name, instrument used, etc., and will list easting, northing (in local NAD 1983 State Plane Coordinates, California Zone IV, feet coordinates), grid number, instrument response and units, source type of response, description, weight, and depth, and have a space for subsequent action taken.

If the anomaly yields a non-MEC item or fragments or pieces of MEC items that are not intact and cannot be positively identified, the approximate total weight and depth will be recorded, but the type of MEC the item is associated with, the distance and direction away from the flag, and the inclination and declination will not be recorded.

If the anomaly is an MEC item or MD that can be identified, the type of MEC, approximate weight, distance and direction away from the flag, inclination and declination will be recorded [Ref. 18, Appendix E, SEA010].

In the event the anomaly is not at the point marked on the ground, the search team will search a 3-foot radius around the flag. All anomalies that cannot be reacquired (false-positives) will be reported. The flag will be left in place and removed by the Geophysical Quality Control (QC) Reacquisition Team in accordance with Section 5.17.2.4.

The items located will be initially classified as materials potentially presenting an explosive hazard (MPPEH) until the object is fully inspected and can be identified as MEC, MD, or metal scrap. MD and metal scrap will be transported from the removal area and stored until it can be disposed of by a foundry and/or recycler, where it will be processed through a smelter, shredder, or furnace prior to resale or release. It is the intent that the MD be disposed of permanently.

2.3.5.3 Near-Surface Anomalies

Near-surface anomalies are those subsurface anomalies that are within 6 inches of the surface and can be excavated using hand tools. Throughout the excavation, the UXO Technician will use a magnetometer to check and verify the location of the anomaly.

2.3.5.4 Backhoe Excavations

Some anomalies are more deeply buried and require excavation using heavy equipment (i.e., backhoe). Prior to the arrival of the heavy equipment, the UXO Team Leader will ensure that a cleared entrance and egress path is available for the heavy equipment. Once on site, the heavy equipment will be used to excavate the earth overburden from the suspect anomaly. The distance to the anomaly will be checked with a hand-held magnetometer during the excavation. A UXO Technician will remove the final 1 foot of overburden using hand tools.

2.3.6 Quality Control

QC is addressed in Sections 5 and 11 of this SSWP Addendum. Section 11 is the Quality Control Plan (QCP), which establishes and describes the quality requirements. The QCP applies to all work performed by the Project Team and their subcontractors. Section 5.0

of this SSWP Addendum is the Geophysical Investigation Plan, which includes a description of QC procedures specific to geophysical operations.

2.3.7 Quality Assurance

WESTON will implement a Quality Assurance (QA) Program for Phase II Seaside MRA Removal Action. It is WESTON'S policy to apply sound and cost-effective QA principles to all of its activities. This assists in ensuring the proper execution of work, the management of liability, and the maintenance of WESTON'S professional reputation for excellence. The WESTON QA Program is an integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement used to ensure that processes and services are of the type and quality needed to meet the project requirements. This includes assessment of QC procedures, to insure they are functioning and all contract/regulatory requirements have been met. QA of the MEC removal action project includes periodic surveillance/audit activities performed by competent personnel from appropriate disciplines (e.g., engineers, UXO qualified personnel, geophysicists), review of project documents/status, observation of field operations for compliance with plans and procedures, seeding of geophysical investigation areas and sifting operations to ensure recovery, and analog investigations of portions of removal action areas having completed the entire removal process, and quality control processes. The established project quality policies and procedures are applicable to all participating project personnel and subcontractors and are applicable to all site activities affecting quality including, but not limited to, MEC investigation and removal operations, demolition operations, handling of demolition materials, geophysical operations, and data management.

FORA will provide independent QA of MEC removal action processes and products with the intent of verifying the quality of MEC removal action work performed by WESTON. An independent QA program will be developed and provided to the regulatory agencies for review and approval prior to starting MEC clearance activities related to the SSWP Addendum.

2.3.8 Site Restoration

Roadway construction will immediately follow removal actions. No site restoration activities will be required by the LFR Team associated with the land included in the roadway alignment. For SCAs outside the roadway alignment, the LFR Team will implement restoration measures as identified in Section 12 – Environmental Protection Plan.

2.3.9 After-Action Report

An AAR documenting the Phase II Seaside MRA Removal Action will be prepared that describes field activities, operations, and results. The AAR will be used to support a determination that the alignment is acceptable for use as a roadway.

2.4 Community Safety Plan

A Community Safety Plan (CSP) similar to the Army's City of Seaside CSP [Ref. 15] is being developed and will be implemented when necessary to ensure the safety of the community.

2.5 Organization

The LFR Team's organizational chart is presented on Figure 2-2. Reporting and communications lines and field teams are identified on this figure. Resumes of key personnel responsible for implementing the work presented in this SSWP Addendum are provided in Appendix D

3.0 EXPLOSIVES MANAGEMENT PLAN

3.1 Introduction

The purpose of the Explosives Management Plan is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, accountability, and transportation of demolition material and MEC.

3.2 Regulatory References

Procedures and information contained in this Explosives Management Plan of this SSWP Addendum were obtained from the following references:

- U.S. Army Corps of Engineers - Huntsville Center (CEHNC) Safety Concepts and Basic Considerations for UXO
- Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) P-5400.7, ATF-Explosives Law and Regulations
- USACE Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual
- U.S. Department of Defense (DOD) 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards
- Department of the Army Pamphlet (DA PAM) 385-64, Ammunition and Explosives Safety Standards
- Army Regulation (AR) 385-64, Ammunition and Explosives Safety Standards
- AR 385-10, The Army Safety Program
- AR 385-16, System Safety Engineering and Management
- USACE EM 1110-1-4009, Ordnance and Explosives Response

3.3 Responsibilities

3.3.1 SUXOS

The SUXOS is responsible for determining the specific site requirements for licensing, permitting, and placarding. Additionally, the SUXOS is responsible for acquiring the initial quantity and type of demolition material and approving all subsequent requests for demolition material.

3.3.2 UXOQCS

The UXOQCS is responsible for inspecting and auditing the entire operation and reporting any findings to the SUXOS and UXOSO. These inspections will include the acquisition procedure, documentation, storage, and transport.

3.3.3 UXOSO

The UXOSO is responsible for ensuring the handling, storage, transport, and use of demolition material in accordance with the approved work plan, SOPs, and federal and state regulations.

3.3.4 Vehicle Driver

The vehicle driver will at a minimum be a qualified UXO Technician II and have a valid driver's license. This is to ensure that the driver is both experienced with and knowledgeable of demolition material. For additional transportation requirements, see Section 3.9.

3.4 Explosives Acquisition

Acquisitions will be made by the SUXOS in a timely manner. The initial acquisition must be in place prior to beginning intrusive activities, and all subsequent shipments must be on site to ensure there is no break in operations. Before ordering demolition materials, the Purchase/Receipt Authorization List (Figure 3-1) must be completed and forwarded to the explosive distributor(s), along with a copy of WESTON'S ATF License.

3.5 Explosives Receipt

Only those individuals named on the authorization list may sign for explosives from the shipper. To ensure that the quantity shipped is the same as the quantity listed on the shipping documents, the UXOSO will inventory the shipment before signing for it. If the UXOSO is unavailable, a designee from the Purchase/Receipt Authorization list will inventory the shipment before signing for the shipment.

In the event that the lock to the storage facility shows signs of tampering or break-in, do not enter the magazine or touch the broken lock/door. Refer to Section 3.9.6, Loss, Theft, and Unauthorized Use of Explosives.

3.5.1 Receipt Discrepancies

Upon receipt of each shipment, the type, quantity, and lot number of each item will be checked against the manifest and entered on the Magazine Data Card (Figure 3-2). In the event there is a discrepancy between the amount shipped and the amount received, the UXOSO will immediately contact the explosive supplier and inform them of the

discrepancy. If there is a discrepancy, do not accept shipment. It is then the responsibility of the supplier to rectify the situation and inform WESTON of the results. If the discrepancy cannot be resolved within 24 hours, notify the RPM, Local Law Enforcement Agency, and ATF.

3.6 Storage

WESTON has the right to use the existing Type 1 explosive storage magazines located at the former Fort Ord Explosive Storage Location (ESL). WESTON will use the existing former government explosive storage magazines for explosive storage and comply with local storage and compatibility criteria and procedures when using government facilities. Section 4.0 presents specific criteria for siting of the explosive storage magazines within the existing ESL. WESTON will ensure that explosive storage magazines are in compliance with the following security requirements.

3.7 Security

The ESL is a fenced and locked facility. No additional security is required.

3.7.1 Exterior Construction

The exterior and doors are to be of not less than 1/4-inch steel and lined with at least 2 inches of hardwood. Magazines with top openings will have lids with water-resistant seals, or which overlap the sides by at least 1 inch when in a closed position.

3.7.2 Hinges and Hasps

Hinges and hasps will be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps will be installed so they cannot be removed when the doors are closed and locked.

3.7.3 Locks

Each door will be equipped with appropriate padlocks fastened in separate hasps and staples. Padlocks must have at least five tumblers or five blades, and a case-hardened shackle of at least 3/8-inch diameter. Padlocks will be protected with not less than 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

3.7.4 Signage/Placarding

ATF and DOD require that all magazines be appropriately posted for content hazard class, fire fighting hazard, and an emergency notification list. Magazines will be placarded in accordance with DOD 4145.26-M and DA PAM 385-64. In most instances,

this will require a Fire Division Class 1 for the recovered MEC magazines. The proposed storage configuration for demolition material will require a Fire Division Class 1. If in doubt and unable to obtain guidance from a reputable source, label the contents with the next highest hazard. In the event there are two fire division or hazard class items in the same magazine, the higher hazard division/class placard should be used.

3.7.5 Lightning Protection

Appropriate lightning protection will be installed in accordance with EM 1110-1-4009, Chapter 11.

3.7.6 Emergency Notification List

An emergency notification list containing the names, telephone numbers, and local addresses of the individuals to be notified in the event of an emergency will be posted on the outside and inside of the magazine door. These individuals should be the same individuals authorized to sign for explosives.

3.7.7 Compatibility

Explosive compatibility will be maintained in accordance with DA PAM 385-64. Table 3-3 lists the various storage compatibility groups, and Table 3-4 is the storage compatibility chart. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, a waiver will be requested, and the incompatible items will be physically separated by a barricade, such as sandbags, within the magazine. This situation should be an interim occurrence and avoided if possible.

3.7.8 Key Control

Magazines will remain locked except when receipts and issues are being made. Keys will be kept by the UXOSO and the UXOQCS.

3.7.9 Inspection

At the start of each workday, a physical check will be made of the magazine storage area to ensure that security has not been compromised. Per ATF regulations, physical inspections of magazines will be conducted weekly.

3.8 Inventory

Upon receipt and verification of explosive demolition material, the Magazine Data Card will be filled out and kept in the magazine on top of the listed item. A duplicate copy will be maintained by the UXOQCS.

3.8.1 Usage Inventory

Following each occurrence of a receipt or issue of explosive material, the UXOSO will conduct a joint inventory in conjunction with the Demolition Supervisor (and experienced UXO Team Leader designated by the SUXOS) drawing out or returning the explosives. Only those items issued/returned will be inventoried. The two sets of Magazine Data Cards will be appropriately annotated.

3.8.2 Monthly Inventory

Monthly, the SUXOS and the UXOQCS will conduct an inventory and record results on the two sets of Magazine Data Cards.

3.8.3 Discrepancies

In the event there is a discrepancy during any inventory, the items will be recounted a minimum of two additional times. If a discrepancy still exists, the RPM and ATF will be notified. A written report will be prepared and submitted within 24 hours of the discovery.

3.8.4 Procedures for Return to Storage of Explosives Not Expended

Explosives that were issued for use but were not needed will be returned daily to the magazines at the completion of disposal operations. The Demolition Team Leader will return the unused explosives to the storage magazine and revise the Magazine Data Card (Figure 3-2) and Explosive Usage Form (Figure 3-3).

3.8.5 Disposal of Remaining Explosives

WESTON is required by ATF to account for all explosives purchased and used. Following completion of work in the Seaside MRA, all unused explosives will be retained for usage in subsequent MRAs. Explosives remaining upon completion of all MRAs will be returned to the supplier.

3.9 Transportation

Transportation of explosives or MEC will comply with all federal, state, and local regulations. Permits are not required under CERCLA for on-site transportation of explosives or MEC. Off-site transportation of explosives or MEC will not be done until coordination and approval has been received from the RPM, RPM, and FORA.

3.9.1 General Highway Transport

The following data are sufficient to meet the requirements for explosive transport.

3.9.1.1 Commercial Motor Vehicle Definition and Requirements (CFR 49 Part 383.5)

Commercial motor vehicle (CMV) means a motor vehicle, or a combination of motor vehicles, used in commerce to transport passengers or property if the motor vehicle includes one or more of the following:

- Has a gross combination weight rating of 11,794 kilograms or more (26,001 pounds or more), inclusive with a towed unit with a gross vehicle weight rating of more than 4,536 kilograms (10,000 pounds)
- Has a gross vehicle weight rating of 11,794 kilograms or more (26,001 pounds or more)
- Is designed to transport 16 or more passengers including the driver
- Is of any size and is used in the transportation of materials found to be hazardous for the purpose of the Hazardous Materials Transportation Act, and which requires the motor vehicle to be placarded under the Hazardous Materials Regulations (49 CFR Part 172, subpart E)

3.9.2 On-Site Transportation

Transportation of explosives and MEC on site will comply with the following:

- Vehicles will be inspected per occurrence and will be properly placarded.
- Explosives will be transported in closed vehicles whenever possible. When using an open vehicle, explosives will be covered with a flame-resistant tarpaulin (except when loading/unloading) or transported in an approved container.
- Vehicle engine will not be running and wheel chocks and brakes will be set when loading/unloading explosives.
- Beds of vehicles will have dunnage, plastic bed liner, or sandbags to protect the explosives from contact with the metal bed and fittings.
- Vehicles transporting explosives will have a first aid kit, two 10-ABC-rated fire extinguishers, and communication capabilities.
- Initiating explosives, such as detonators, will remain separated from other high explosives during loading, unloading, and while on vehicles.
- Compatibility requirements will be observed.
- Operators transporting explosives will have a valid drivers' license.
- Drivers will comply with posted speed limits, but will not exceed a safe and reasonable speed for conditions.
- Vehicles transporting explosives off-road will not exceed 25 miles per hour (mph).

3.9.3 Off-Site Transportation over Public Highways

3.9.3.1 DOT Certificate of Registration

As long as only 1.4 explosives or less than 55 pounds net explosive weight (NEW) of 1.1, 1.2, or 1.3 explosives are transported by personnel, Department of Transportation (DOT) certificates of registration for individuals involved in the transportation of demolition materials are not required.

3.9.3.2 Commercial Driver's License Requirements

As long as site personnel are not using vehicles that weigh more than 26,000 pounds and are not transporting any materials that must be placarded under the DOT Hazardous Materials Regulations (i.e., they are only transporting 1.4 explosives), then the vehicle being used need not be classified as a CMV and the operator of the vehicle need not have a Commercial Driver's License (CDL). This is the typical situation for site personnel because they usually transport relatively small quantities of 1.4 demolition materials. However, if a CDL is required, the RPM will ensure that the requisite license/permits are obtained.

3.9.3.3 Mixed Packaging Requirements

Explosives of compatibility Group S may be packed with explosives of all other explosive compatibility groups except A and L. To determine the compatibility of the materials typically transported by site personnel, refer to the material safety data sheets (MSDSs). A current listing of all MSDSs is maintained by the UXOSO.

3.9.4 General Placarding Requirements

Should placarding be required, it will be done according to 49 Code of Federal Regulations (CFR) 172.504. The placard requirements as identified in 49 CFR 172.504 and listed below will apply to explosives transportation, if applicable:

- *Subparagraph (a)* - Except as otherwise provided, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 1 and 2, in accordance with other requirements and exceptions. (See Tables 3-1 and 3-2 of this SSWP Addendum).
- *Subparagraph (c)* - Exceptions for less than 454 kg (1,001 pounds). Except for bulk packaging and hazardous materials subject to § 172.505, when hazardous materials covered by Table 2 of this section (see Table 3-2 of this SSWP Addendum) are transported by highway or rail, placards are not required on:

1. A transport vehicle or freight container which contains less than 454 kg (1,001 lbs.) aggregate gross weight of hazardous materials covered by Table 2 (see Table 3-2 of this SSWP Addendum) of paragraph (e) of this section; or
2. A rail car loaded with transport vehicles or freight containers, none of which is required to be placarded.

- The exceptions provided in subparagraph (c) above do not prohibit the display of placards in the manner prescribed in this subpart, if not otherwise prohibited (see § 172.502), on transport vehicles for freight containers that are not required to be placarded.

3.9.5 Documentation

Any time explosives are being transported, completed copies of documents described below will be in the vehicle.

Instructions for Motor Vehicle Owners - Emergency Response Information

Only those items that are being transported will be entered in the form shown in Figure 3-4 with the applicable quantity/units and weight columns completed. The NEW limitations of 55 pounds will not be exceeded. All required data will be entered on the front, and the Guide 50 block will be checked on the back of the form.

Explosives Purchase/Receipt/Transport Authorization List

This list shown in Figure 3-1 will be completed ensuring the pertinent data for all personnel transporting explosives is included on the form. As with the other required forms, this one will be part of the transport paperwork. Only the route shown will be used unless there is an emergency or the route is blocked. Any deviation from the planned route will be reported to and coordinated with the RPM.

Motor Vehicle Inspection Checklist

The checklist, shown in Figure 3-5 will be completed prior to placing any explosives in the vehicle and will accompany the shipment.

ATF Permit/License

A copy of the current ATF license will accompany the vehicle and be readily available.

3.9.6 Loss, Theft, and Unauthorized Use of Explosives

If, during an inspection of the explosive magazine, it is determined that forced entry has occurred, personnel will follow these rules:

- Do not enter the magazine.
- Do not handle or disturb items within the immediate vicinity.
- Secure the magazine by posting a guard to prevent further access.
- Immediately notify the following individuals:
- LFR Program Manager
- WESTON UXOSO
- WESTON RPM
- WESTON UXO Service Line Leader
- WESTON UXO Technical Manager
- Local authorities as directed
- ATF
- Do not allow entry into the magazine by others until law enforcement personnel arrive.
- Immediately upon request of Law Enforcement Personnel, perform physical inventory and reconcile on-hand explosives with Magazine Data Cards.
- Assist above individuals and agencies as needed.

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4.0 EXPLOSIVES SITING PLAN

4.1 Introduction

This Explosives Siting Plan outlines the procedures that will be used to perform MEC identification, treatment operations, and explosives storage at the former Fort Ord and describes the safety criteria to be employed.

4.2 Explosives Storage Magazine

WESTON will use government-supplied explosives storage facilities at the former Fort Ord. Use of the explosive storage facility requires prior approval of the Explosive Safety Submission and a Right of Entry agreement from the Army. If the storage magazines are not available or if WESTON is required to install additional magazines, commercial Type 2 magazines will be used.

4.2.1 Type(s) of Magazines

The ESL has standard earth-covered and aboveground magazines for storage of explosives. If commercial magazines are required, WESTON will use a portable apparatus approved by the ATF for Type 2, outdoor, box magazines. WESTON will:

- Locate, install, and maintain the magazines to comply with the magazine quantity distance criteria established in DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards.
- Install magazines in order to comply with explosive compatibility requirements (i.e., bulk explosives, initiating explosives, and MEC awaiting demilitarization).
- Establish security, as necessary, such as fencing and/or guards, to prevent unauthorized access and/or theft.
- Establish magazines that are bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated. These will be supported to prevent direct contact with the ground. The ground around them will slope away for drainage or other adequate drainage will be provided.
- Attach hinges and hasps to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps will be installed so they cannot be removed when the doors are closed and locked. Doors will also be equipped with appropriate padlocks.

4.2.2 NEW and Hazard Division

The typical contents of the ESL, including the NEW and Hazard Division of stored explosives, are presented in Table 4-1.

4.2.3 Quantity Distance Criteria for Siting

The quantity distance criteria for siting of building and public traffic routes relative to the ESL is included in Table 4-1 and illustrated on Figures 4-1, 4-2, and 4-3. Explosive storage will be in compliance with DOD 6055.9-STD and DA PAM 385-64, which will be used to establish any additional magazines on DOD property.

DOD and the ATF quantity distance criteria are included in this section. Because the explosive storage magazines are currently located on DOD property, the quantity distance criteria required by DOD Ammunition and Explosives Safety Standards (DOD 6055.9-STD) will be followed. It is anticipated that land transfer between the Army and FORA will occur during the execution of this project. After property transfer, the ESL will be on private land, and explosive siting will follow ATF, state, and local requirements.

ATF P-5400.7 Federal Explosive Law and Regulation Subpart K Table 55.218 stipulates that NEW between 20 and 30 pounds can be stored in earthen-covered Type 1 magazines as long as the magazine is 250 feet from inhabited buildings and 100 feet from public roadways. All explosive storage will be in accordance with ATF P-5400.7 Subpart K.

4.3 MEC Removal

The MEC items encountered within the Seaside MRA as a result of MEC sampling and removal actions are listed in Appendix B.

4.3.1 Minimum Separation Distance

In order to establish the minimum separation distance (MSD) between people and property for unintentional detonations, the hazardous fragment distance for encountered MEC is evaluated using the DDESB's Technical Paper No. 16, Revision 2, "Methodologies for Calculating Primary Fragment Characteristics," dated October 2005 [Ref. 19]. The Seaside MRA covers a large area with a wide range of historical uses; therefore, the MSD will vary depending on the type of MEC that is anticipated to be encountered in a particular work area. Based on a review of previously encountered MEC, the MSD during excavations in the Seaside MRA will vary. Table 4-2 includes all anticipated MSDs for the Seaside MRA. If MEC is found that is different than previously identified, then a new MSD will be calculated. Intrusive MEC removal activities will be conducted following approval of the explosives safety submission.

If the MSD for unintentional detonations cannot be maintained as an exclusion zone, engineering controls will be used to reduce the distance. In the event that the MSD cannot be maintained even after engineering controls have been implemented, the UXOSO will notify the WESTON RPM immediately.

A safe separation distance of 200 feet is also required between individual UXO Teams working in the Seaside MRA.

4.3.2 Demolition Areas (Intentional Detonations)

MEC will be disposed of in the areas where the item(s) are encountered.

4.4 Footprint Areas

Footprint areas for intrusive and demolition operations will be established during field operations.

4.4.1 Engineering Controls

In areas where an acceptable fragmentation distance cannot be achieved, items that are safe to move may be moved to another area as long as the movement does not require transportation on public roads. If movement to another area is not possible, other methods of mitigation, such as berms, tamping, or sandbag barricades (in accordance with HNC-ED-CS-S-98-7) will be employed to reduce the fragmentation hazard.

4.4.2 Blow In-Place

Prior to initiation of demolition operations, all nonessential personnel will be evacuated from the exclusion zone. Before the demolition charges are primed, all avenues of ingress will be physically blocked by guard personnel. Radio communications will be maintained between all involved parties at all times. Avenues of ingress are not to be opened without the permission of the SUXOS. A constant state of vigilance will be maintained by all personnel to detect any intrusion into the fragmentation zone or over flights of aircraft. Upon completion of disposal operations, the Disposal Team's UXO Technician III (Demolition Supervisor) and the UXOSO will visually inspect each disposal shot. The Technician III will perform a visual inspection of the disposal site(s). The UXOSO will stand by at a safe distance and be prepared to render assistance in the event of an emergency. Upon completion of this inspection and providing that there are no residual hazards, the SUXOS will authorize the resumption of operations.

Prior to any detonation, the SUXOS will initiate the appropriate notification and approval procedure. The SUXOS will schedule the demolition to allow sufficient time to complete all notifications and approvals.

Notifications and approvals will be conducted as follows:

- Complete the MEC Disposal Checklists and notifications for each disposal operation
- Request POM FD to perform an on-site fire risk assessment. For planned detonations, risk assessments require a 3-day notification and demolition shots require a 5-day notification. POM FD will expedite risk assessments for demolition shots that cannot be delayed. Following property transfer, requirements for risk assessments will be determined by the City of Seaside Fire Department.
- Complete a Detonation Approval Checklist/Risk Assessment and submit to the FORA ESCA RPM for approval.

- Coordinate mass detonations with the Federal Aviation Administration (FAA). Mass detonations are not expected for this project. If necessary, the UXOSO will contact FAA for air clearance and will hold on line until the shot is fired.

4.4.3 Collection Points

Items that are unsafe to move will be disposed of in the location where they are encountered. Items containing residues and items requiring demilitarization may be stored in the MEC explosive magazine and added to future planned demolition shots.

4.4.4 Consolidated Shots

Items that are safe to move (unfuzed or unfired) may be consolidated to one location within the Seaside MRA to reduce the number of demolition shots and fragmentation contamination. Consolidated shots will be in accordance with the CEHNC report entitled "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites" [Ref.1, Appendix G]. A copy of the report will be available on site for reference.

4.4.5 Confirmatory Methods

To reduce the number of shots, shape charges (small conical charges) will be used to determine if an item is completely inert.

5.0 GEOPHYSICAL INVESTIGATION PLAN

Section 5.0 details the GIP for Phase II removal actions that will be performed in the Seaside MRA. This plan replaces the GIP presented in the PWP [Ref. 1].

5.1 Objectives

Geophysical surveys will be performed in SCAs within the Seaside MRA to establish and record the locations of DGM anomaly targets.

5.2 Specific Areas to be Investigated

Appendix A displays each of the known SCAs within the Seaside MRA. The operational activities that will be performed in the SCAs are shown on Figure 2-1.

5.3 Anticipated MEC Types

MEC recovered during previous investigations in the MRS-15SEA.1–4 are listed in Appendix B.

5.4 Anticipated Penetration Depths

The majority of the MEC recovered from the Seaside MRA were found on the surface, within 1 foot below ground surface, or in a few discrete burial pits. The depth of recovery for individual ordnance types was much less than the maximum calculated penetration. Many items were recovered from burial pits. The depths of items in burial pits are much deeper than would be expected for recovery of individual items. Table 5-1 compares the recovery and penetration depths of MEC previously encountered in MRS-15SEA.1–4.

5.5 Topography

The topography of the survey sites is rolling hills. A majority of the slopes can be surveyed using digital instruments; however, some deep gullies will need to be investigated using a more portable instrument (e.g., analog Schonstedt magnetometer).

5.6 Vegetation

The vegetation covering the survey sites is primarily comprised of central maritime chaparral with patches of nonnative grassland and stands of oak trees. Vegetation will be cleared in order to facilitate geophysical survey

5.7 Geologic Conditions

Previous experience in the subject site suggests that there will be little effect on electromagnetic digital geophysical instruments from magnetic concretions common to the Santa Margarita Formation. Schonstedt magnetometers will likely have continued "ring-offs" from geologic materials.

5.8 Soil Conditions

Soil conditions at the survey sites are predominantly sandy and provide a relatively good environment for electromagnetic (EM) and magnetic surveys.

5.9 Groundwater Conditions

Groundwater investigations associated with the basewide RI/FS included water level measurements at several wells located near the survey sites in the western portion of the MRA. Based on water-level data from these wells, the vadose (unsaturated) zone in the uppermost aquifer ranges in thickness from 60 to 180 feet. These groundwater conditions are not anticipated to have a detrimental effect on the geophysical survey [Ref. 12].

5.10 Geophysical Conditions

The geophysical conditions in the survey areas are affected by both vegetation and terrain, which limit the access of certain instruments and positioning systems. Previous Time-Critical Removal Actions removed metal objects greater than 1 inch from the ground surface. Background geophysical signals/gradients are expected to be in the range of 1 to 3 millivolt (mV) for EM surveys and 1 to 3 nanoteslas (nT) per foot for magnetic gradiometer surveys.

5.11 Site Utilities

An overhead high-tension power line crosses through three of the Seaside parcels: MRS-15SEA.1, MRS-15SEA.2, and MRS-15SEA.3. The power lines and metal towers that support the power lines may interfere with the geophysical instruments. In addition, there may be a buried cable along portions of General Jim Moore Boulevard that may interfere with the geophysical survey.

To minimize the effects of interference from the site utilities on the geophysical survey, the geophysical survey will first be performed with the BADT geophysical instrument. If there is interference from the site utilities while using the BADT geophysical instrument and if that instrument is digital, the geophysical survey will then be performed with the next BADT analog geophysical instrument (e.g., Schonstedt magnetometer) and the instrument change will be documented. The AAR will detail the results and evaluate the

success of the geophysical survey. Currently, there are no plans to disrupt the service of site utilities during the geophysical survey.

5.12 Man-Made Features and Dynamic Events Potentially Affecting Geophysical Investigations

The structures present in the MRS-15SEA.1–4 include range towers, field latrines, and range pads. In addition, an injection well is located in MRS-15SEA.2. The area surrounding the injection well in MRS-15SEA.2 was cleared of MEC to a depth of 4 feet using Schonstedt magnetometers as part of the grid sampling in May 1999 [Ref. 9].

Dynamic events such as rain, lightning, and solar flares may affect geophysical data collection. Procedures for geophysical survey operations when these events occur are provided below.

Rain

The effect of rain on geophysical operations is primarily dependent on the instrument, the technology being utilized, and the physical site conditions (terrain and vegetation). Most of the instruments commercially available are relatively water resistant. Additional measures will be taken by the geophysical teams (such as covering connections with plastic sheeting) to reduce the possibility of moisture affecting the instrument's electronics. When possible, geophysical teams will operate the instruments under very light rain conditions (drizzling). If the rain persists and the geophysical team leader determines that there is a potential for an impact to the data quality or that moisture could be getting into the instrument, field operations will cease and the Project Geophysicist will be notified. Operations will continue when the rain has ceased or has reduced to a drizzle.

At sites where footing for the operators becomes difficult because of wet terrain or vegetation, operations will cease until the area is deemed safe by the UXOSO. The determination to stop will be made by the field team leader or the UXOSO and the Project Geophysicist will be notified.

Lightning

Because all geophysical instruments can serve as conduits for lightning, any observed lightning in the area will be considered a safety hazard and survey activities will be stopped until all lightning activity has ceased. Site personnel and equipment will be taken to a safe area. The determination of the presence of lightning can be made by any site personnel, who will then immediately contact the UXOSO. The UXOSO will make the determination as to when geophysical operations are stopped and when they can resume.

Solar Flares

Solar flares are sun-generated atmospheric phenomena, typically occurring in the afternoon. Solar flares may temporarily generate sufficient high-magnitude magnetic noise so as to make magnetometers, often gradiometers, GPS navigation, and occasionally electromagnetic sensors unusable for the duration of the event. Solar flares are typically readily observable by the instrument operators throughout the area as rapidly fluctuating signal readings with no apparent cultural or survey source. The Project Geophysicist will be alert to solar flares and temporarily cease data collection until static testing shows a cessation of the solar activity. The Project Geophysicist will log the time intervals when solar flare activity is observed to help determine whether any data have been affected.

5.13 Overall Site Accessibility and Impediments

Site accessibility across the Seaside MRA varies from easy to moderately difficult. Site accessibility is limited in areas of heavy vegetation. Other conditions likely to affect accessibility include the proximity to roads, terrain, and sensitive environmental habitats. Procedures for obtaining access to sites will also be developed as needed.

All geophysical survey areas can be easily accessed via General Jim Moore Boulevard or Eucalyptus Road. Four-wheel-drive vehicles will be used on established dirt roads within the survey areas in order to access the areas that are farther than approximately 200 feet from the edge of the paved roads. An alternative means of entry will be established around any existing habitat area.

5.14 Potential Worker Hazards

No additional hazards are known to be present at the survey sites other than those discussed in the PWP [Ref. 1]. The SSWP Addendum Section 6.0 contains a site-specific hazard analysis.

5.15 Surveying Activities

As a preliminary activity, an LFR Team subcontractor will stake the SCA boundaries based on the coordinates as reported in the Army's GIS and databases, where the 100 percent DGM survey will be completed. Coordinates for additional boundary and field surveys will be based on NAD 83 California State Plane Zone IV, Feet. Section 2.0 of this SSWP Addendum and Chapter 7 of the PWP [Ref.1] provide additional mapping and surveying information.

5.16 Brush Clearing

Brush clearing will be performed by an LFR Team subcontractor. The method of brush clearing will vary from manual clearance using chainsaws, brush cutters, and other handheld tools to clearance using heavy machinery. Protocols and methods for brush clearing are included in the Vegetation Removal SOP of the PWP [Ref.1, Appendix G]. These protocols and methods will take into account the following:

- Goals of the geophysical survey
- Vegetation
- Terrain
- Instrument(s) being used for the survey
- Threatened species present on the site (wildlife and plants)

5.17 Geophysical Investigation Methods

This section summarizes the equipment and methods that will be used to perform the geophysical investigations in the project sites.

5.17.1 Geophysical Instruments and Selection Criteria

Three geophysical instruments (two digital and one analog), which use two different geophysical methods (TDEM and magnetometry), will be used in the investigation. The two digital geophysical instruments that will be used are the data recording Geonics® EM61-MK2 (0.5m by 1m coils) TDMD and the Geometrics® G-858 digital magnetometer; both digital geophysical instruments record data. The one analog instrument that will be used is the Schonstedt® GA-52/Cx magnetic gradiometer, which will be used for "mag and dig" operations, as necessary.

The selection of these geophysical instruments was based on three factors: the site-specific information summarized in sections 5.3 to 5.12, the results of the ODDS [Ref. 14], and experience with previous geophysical surveys at Fort Ord. The ordnance types that are anticipated to be present in the Seaside MRA range in size and penetration depths. The ODDS Receiver Operating Characteristic curves for the various field trial sites indicate that several instruments would be best for the ordnance and conditions anticipated at the Seaside MRA [Ref. 14, Appendix D, Tab 5]. Therefore, the reasons for selecting these three geophysical instruments are as follows:

1. Some of the MEC items that were found in previous investigations were large items that had penetration depths greater than 24 inches (Table 5-1).1 During the ODDS, the EM61 and G-858 were determined to be the best tools in detecting larger items at greater depths.

2. The anticipated types of MEC do not include any items that are completely nonferrous; therefore, either electromagnetic or magnetic techniques can be used. Electromagnetic techniques are preferable because they will help detect ordnance that contains nonferrous components (e.g., grenade fuzes and signal illuminations [slap flares]).

3. The EM61, G-858, and Schonstedt are durable and rugged enough to be used in the field and they are commercially available.

Several models of the EM61 were evaluated during the selection process. The 0.5m-by-1m EM61-MK2 was determined to have a greater ability to detect the smaller and shallower items than the standard 1m-by-1m EM61. Furthermore, the results of the ODDS seeded test proved that the 0.5m-by-1m EM61-MK2 could still detect the larger, deeper items that the handheld EM61 could not detect.

Between the 0.5m-by-1m EM61-MK2 and the G-858, the 0.5m-by-1m EM61-MK2 was selected as the primary digital geophysical instrument for the following reasons:

1. It is easier to maintain a constant height above the surface with the 0.5m-by-1m EM61-MK2 than with the G-858 digital magnetometer.

2. It is easier to attach GPS rovers to the center point of the 0.5m-by-1m EM61-MK2 than it is to attach them to a G-858.

3. The 0.5m-by-1m EM61-MK2 is less sensitive to nearby structural interferences (e.g., fences, buildings, and power lines) than the G-858.

4. Data are not affected by survey direction.

5. Data “dropouts” are far less frequent with the 0.5m-by-1m EM61-MK2 data than with the G-858 data.

6. The 0.5m-by-1m EM61-MK2 detects both ferrous and nonferrous metal objects.

The 0.5m-by-1m EM61-MK2 will primarily be used with 2-foot line spacings and with the 1m edge of the instrument oriented perpendicular to the direction of travel.

However, the G-858 may be used within the SCAs where difficult terrain may prohibit the use of a man-towed or all-terrain-vehicle- (ATV-) towed EM61-MK2 unit. Schonstedt GA-52/Cx magnetometers will be used to perform “mag and dig” surveys in areas that cannot be surveyed using the digital techniques. The locations of any MEC items that are located by using this method will be recorded with a GPS (or other survey method under vegetation canopy). The Schonstedt GA-52/Cx magnetometers will also be used during analog QC surveys.

5.17.2 Geophysical Investigation Performance Goals

5.17.2.1 MEC Detection

The performance goal for Seaside MRA geophysical investigations will be to detect all items in the subsurface that can be detected given the particular instrument and the site-specific conditions (terrain, vegetation, cultural). There will be no "data gaps" between survey lines unless previously mutually agreed upon by the LFR Team and the Regulators or resulting from unmovable obstacles. Section 5.19 addresses the maximum allowable distance between sequential survey lines.

5.17.2.2 Performance Goal Modification

Data gaps will remain in the vicinity of inaccessible areas: high power transmission towers, and in areas containing buried utilities (active and inactive) and power poles.

5.17.2.3 Horizontal Accuracy

The accuracy goal for locating DGM anomaly targets within the survey grids is ± 0.5 feet in the along track direction (i.e., in the direction that the data were collected) and ± 1.0 feet in the across track (x, y) direction (i.e., in the between-lane direction).

5.17.2.4 False Positives

"False Positives" result when an anomaly is detected at a given location, declared as a significant anomaly to be intrusively investigated or otherwise posted to a "dig sheet," and no basis for the anomaly is found upon excavation. False positives can be a result of low threshold selection of anomalies (i.e., extremely conservative anomaly picking), spikes in the data not successfully removed during processing, instrument jolts resulting from terrain, and inhomogeneities in the subsurface. False positives are unavoidable and do not affect the data quality in terms of removing MEC items from the subsurface. The performance goal with respect to false positives is to minimize their occurrences while maintaining the same MEC identification rates. The Project Geophysicists will use professional judgment to minimize the possibility that potentially dangerous MEC items are left in the subsurface. In this regard, he or she will tend to err on the conservative side by selecting anomalies having amplitudes close to the range of background "noise," but which have the potential to be associated with MEC.

5.17.2.5 False Negatives

A false negative is defined for this project as a location where a buried metallic item is found, which was within the detection capability of the geophysical survey instrument

but whose location was not selected for intrusive investigation. False negatives can be a result of instrument failure, operator error, or data processing error. The performance goal with respect to false negatives is to have zero occurrences over the course of the project. False negatives are often difficult to identify. Typically, a false negative will be found during the reacquisition phase, where a reacquisition team notices an anomalous response from their equipment at a location that was not previously identified. Other means of finding false negatives include returning to the site and resurveying the area (such as during a QC check), or by excavating the area and exposing the soil for visual inspection.

5.17.2.6 Geophysical Test Plot

The ODDS was the geophysical proveout for selection of instruments at the Seaside MRA. A limited geophysical test plot will be used prior to conducting geophysical work within the Seaside MRA. The purpose of these procedures is to show that the geophysical instruments detectors are functioning properly and optimized for field use. A cleared area will be established where each geophysical instrument intended for use will be tested before and after every field deployment. Either inert munitions or simulated MEC items, of approximate size and weight of items previously removed from the sites will be buried at various depths and orientations within the geophysical test plot to facilitate the calibration and system control check activities, and to document system performance. Each seed item will be photographed, painted blue, and tagged with its respective ID number identifying the item as inert so that they cannot be mistaken for actual field items. Seeded items will be removed upon completion of the project activities.

5.17.2.7 Geophysical Test Plot Reporting

Initial test plot results will be discussed between the Project Geophysicist and the QC Geophysicist. A memorandum describing the design and initial results of the test plot will be submitted to the Project Team prior to beginning geophysical operations. Feedback will be included in the test plot memorandum. The test plot memorandum will include the following:

- As-built drawing of the test plot including depth and orientation of seeded items
- Representative photographs of the seed items
- Color plots of the DGM data
- Target dig lists showing comprehensive results
- Summary of the test plot results

5.17.3 Geophysical Navigation Methods

Two navigational methods will be used for site surveys: GPS and local (fiducial-based) navigation. These methods are described below.

5.17.3.1 Global Positioning System

The GPS consists of 24 DOD satellites that travel approximately 11,000 miles above the earth's surface and complete full orbits twice a day. The satellites broadcast radio wavelengths containing data that is collected by GPS receivers. A computer and the proper software allow GPS receivers to determine extremely accurate positions on earth.

5.17.3.2 Global Positioning Procedures

Real-time kinematic (RTK) GPS will be used for a portion of the geophysical survey to acquire real-time California State Plane coordinates to geo-reference data points. The RTK base station will be set up each day by the geophysical teams before beginning survey activities (unless a permanent base station provided by the survey subcontractor is available). The setup includes placing a Trimble 5700 (or comparable) GPS base station receiver at the established control point monument and then performing instrument function checks to ensure that radio signal communications have been established. The base station will be operated from an automobile battery for extended power throughout the day. Each rover receiver will then be taken to a QC positioning location with known coordinates, and the accuracy of the GPS reading will be determined and recorded in the field records.

GPS data will be collected by each GPS rover receiver and will be recorded digitally over the course of the day. Geophysical data will be collected in data recorders attached to the geophysical equipment. The data collected in the data loggers will be downloaded to laptop computers on an "as needed basis" throughout the course of the survey day. At the end of the day the data will be transferred to the geophysical processing team.

GPS data will provide accurate data positioning information when combined with the geophysical data. For "line and fiducial" DGM surveying (using local grid coordinates), geo-referencing the geophysical data will be accomplished using information recorded on a personal digital assistant (PDA; e.g., start and end of line stations, lane spacing, and fiducial mark intervals) and information digitally recorded in each geophysical survey data file. The geodetic coordinates of the grid corners will be used to geo-reference the geophysical data collected without the GPS (i.e., translation from local grid system to California State Plane Zone IV system).

5.17.3.3 General Procedures

The following is a general list of procedures for carrying out the geophysical/GPS (if used) surveys.

1. Set up survey area as necessary using survey tapes and traffic cones for navigational guidance.

2. If not using GPS, set up fiducial markers across survey area at a minimum of 50-foot intervals.

3. Set up the instruments as described in their accompanying manuals.

4. If using GPS, mount the rover antenna centered directly above the geophysical instrument or on the instrument operator. If mounted on the operator, accurately measure the horizontal distance between the center of the GPS rover and the center of the geophysical instrument while the operator is separated from the instrument as he/she will be during the survey.

5. Activate the geophysical and GPS rover units.

6. Synchronize instrument clocks (if necessary).

7. If not using GPS, place standard metal item (10-inch metal nail or comparable) at the 0,25 and 100,75 foot local coordinates of the grid block after clearing locations for anomalies with the survey instrument. If the instrument indicates an anomaly at that location, place a nail in an alternate measured location along the traverse line. Record the location on the field form.

8. Perform instrument and QC checks as defined in Section 5.23 in this SSWP Addendum.

9. Utilize instrument manuals as necessary to set up data recorders for surveys.

10. Perform geophysical surveys as defined in this SSWP Addendum, ensuring that survey spacing, lag bars, and test spikes are used as described in the plan. Follow instrument manual instructions specific to the instruments in use.

11. One member of each team will be responsible for maintaining the field forms. Fill out field forms specified for data collection in this SSWP Addendum and record the following information in the field forms:

    - Location (Test Area ID)
    - Serial numbers of GPS rover unit (if used) and geophysical instrumentation
    - Quality control performed
    - Instrument offset times (if GPS used and logged separately from geophysical sensor data)
    - Accurate locations of standard metal stakes
    - Time survey started
    - Time survey completed
    - Names of team members

- Weather conditions
- Survey directions
- Sketch of surveyed area and survey path (include north arrow and approximate scale)
- Sketch locations of surface features in survey area (i.e., roads, utility poles, sewer covers, etc.)
- Data collection rate (i.e., 10 samples/second or 1 sample/0.67 feet)
- Survey stake identifications (place on sketch)
- Any instrument peculiarities noted
- File names

12. End of the day:

- All equipment is returned to storage and the batteries are placed on charge
- The field form pages are photocopied and placed in the appropriate backup folder or digital field forms are downloaded
- The data files are given to the geophysical data processing center

5.17.3.4 GPS/Geophysical Instrument Synchronization

If the GPS and geophysical instruments are not directly linked, at the start of each day the internal clocks of the geophysical equipment will be synchronized with the GPS system's internal clock. If during the day a difference is noted between the clocks in the geophysical equipment and GPS equipment, then the difference will be recorded on the field forms. Because the clocks in the GPS systems are more accurate than the clocks in the geophysical equipment, during the data processing phase, geophysicists will correct the discrepancy between the time-stamped GPS data and time-stamped geophysical data.

5.17.3.5 Geophysical Mapping Procedures

Geophysicists will use local navigation methodologies or tracking systems such as GPS or ultrasonic positioning systems to record the location of data acquired. Vegetation and terrain conditions will limit the areas where GPS can be used. A mix of positioning systems and local navigation methodologies may be used to successfully complete the geophysical mapping. All navigation data will be translated to NAD 83 California State Plane, Zone IV, coordinates.

5.17.3.6 Local Navigation Methodology

Local navigation methodologies include the use of surveyor's tapes (or graduated static ropes), range markers (traffic cones or high visibility tripods), information recorded on the field forms (start and end of line stations, lane spacing, fiducial mark intervals, etc.), and information digitally recorded in each DGM survey data file. The geodetic coordinates of the grid corners are used to geo-reference the geophysical data after the data have been collected. Surveyor's tapes (or graduated static ropes) will be laid out in east-west or north-south directions as the terrain allows. Range markers are then placed along the line to be surveyed and provide the geophysical operator with a navigation aid allowing him or her to traverse the line in linear fashion. Fiducial data markers will be inserted manually by the operator at intervals not to exceed 50 feet. In areas of rough terrain or thick vegetation, 25-foot intervals will be used. These markers will be used to accurately locate each data measurement point during the post-processing stages.

The field forms' recorded information and fiducial marks are used to correct the geophysical data to either compress or expand the recorded measurement locations for each line so that they cover the actual distance traveled. This operation is required to compensate for variations in the terrain along the survey line, which affects the rotation of the instrument's wheels, or to compensate for the walking speed of the operator, depending on the instrument selected. The survey data are then rotated and translated from the local coordinate system in which they were collected (where the southwestern corner of the grid surveyed was assigned a coordinate of 0E, 0N) to the NAD 83 California State Plane coordinate system.

5.17.4 Establishing Geophysical Reference Data Points Using GPS

The Army established a reference point using a Trimble 4700 differential GPS in order to obtain a semipermanent base station reference point. First-order coordinate information for a National Aeronautics and Space Administration (NASA) GPS control point was provided in the vicinity of Range 28. The GPS equipment was used over this known point to establish the semipermanent point near Range 24. Table 5-2 provides the coordinates of the NASA GPS point and the coordinates of the semipermanent point at Range 24. A secondary semipermanent point may be established in the vicinity of MRS-15SEA.1-4 that would be used to verify the day-to-day operation of the GPS instruments.

This network of control points and semipermanent survey points will be used for all GPS operations for this project unless other established points are identified and verified for accuracy.

5.17.5 EM Surveys

EM surveys will be performed using the two methods that are detailed in the following sections.

5.17.5.1 Link GPS and EM61-MK2 Data

The first method of EM61-MK2 data collection will be to link the EM61-MK2 data with the GPS data. An RTK GPS rover will be attached to the EM61-MK2 directly above the center of the instrument using a tripod. The RTK GPS will be used to collect geo-referenced positions that will be streamed directly into the geophysical instrument data collection system. The manufacturer's specified accuracy for the RTK GPS positioning systems is centimeters.

For a towed-array system utilizing multiple EM61-MK2 units on an ATV, the operator will observe the navigation/satellite data being collected in real time, using Maglog Software on a field computer. The software is programmed with an automatic default that will notify the operator via voice command in the rare event that satellite lock is lost. In this instance, the operator will cease data collection until the system regains the appropriate satellites and positional dilution of precision (PDOP).

GPS data will be collected at 1-second intervals, while EM61-MK2 data points will be collected approximately 10 times/second. With an operator speed of approximately 3 feet/second, this data collection yields a sample interval of approximately one sample per 0.3 foot traveled.

The quality control methods that will be used to document navigational and positioning accuracy for the streamed GPS and EM61-MK2 data (to determine the temporal latency effects inherent to the equipment) will either be a "lag" bar or a "clover" survey over a standard spike. The lag bar method consists of placing a 5-foot piece of steel rebar on the ground outside the survey grid, passing over it in three passes, and collecting data at the start and end of the survey. The processing team will adjust the data until the high amplitude response from each pass associated with the bar lies in a straight line. The clover method consists of passing over a standard spike in a clover-type fashion, crossing several times over the spike, at both the start and end of the surveys. When the data are processed, the data processor adjusts the data so that the high amplitude peaks associated with the spike are all in approximately the same location.

5.17.5.2 Local Grid Coordinate System with EM61-MK2

The second method of data collection is to use a local grid coordinate system and collect parallel paths of data through each grid, recording data in a polycorder (portable data logger). Typically this data collection method will be used in survey areas where RTK GPS positioning is unavailable. Data points will be collected at approximately 10 readings/second. All the surveys will begin in the southwest corner of an area that will be surveyed; the southwest corner will be assigned a local coordinate of (0,0). The operator will then begin the data collection process by starting the instrument with the polycorder and walking in a straight line toward the northwest corner (or southeastern corner—depending on survey direction) of the survey area. Survey tapes, marked ropes, and traffic cones will be laid down at 25-foot intervals, perpendicular to the direction of travel to help the operator walk in a straight path. Also, as the EM61-MK2 wheels cross the

survey tapes or ropes, a fiducial mark will be inserted into the data using a manual marker switch attached to the polycorder. These points will be used later to adjust the survey data positioning.

At the opposite edge of the survey area, the operator will stop the data collection process as the EM61-MK2 wheels cross the end line. The operator will then turn around; face the opposite edge of the survey area; move 2 feet east (or north—depending on survey direction) of the centerline of the last lane; input the new direction; start inputting coordinate information into the polycorder; and begin surveying a new path. This process will be repeated until the entire grid has been covered. The second geophysical team member will record survey information on a PDA.

When a tree, gully, or other obstruction is encountered, the operator will pause the instrument, insert the position coordinate along the traverse line into the polycorder, and restart the survey on the opposite side of the obstruction, inputting the new start location in to the polycorder. The second geophysical team member will record the approximate obstruction location and the start and stop points of data collection on the field survey form. These data gaps will be logged in the database and investigated using a Schonstedt magnetometer to perform a "mag and dig" operation during intrusive investigations.

Generally, up to five 100-foot by 100-foot grids will be linked for the individual surveys. This reduces the number of times across the site that operators need to stop at line ends and input data into the polycorders.

5.17.5.3 Link GPS and G-858 Data

The first method of G-858 data collection will be to link the G-858 data directly with the GPS data. A GPS rover will be attached to the G-858 directly above the center of the instrument (approximately 3 feet) using an aluminum pole, or the rover will be placed on the operator's back. GPS data will be input directly into the G-858 data recorder and stamped immediately to the G-858- data. GPS data will be collected at 1-second intervals, whereas G-858 data points are collected at 10 times/second. (approximately 1 sample per 0.3 foot traveled). Data positioning for the geophysical points collected between the 1-second intervals of GPS data points will be interpolated by the Geometrics MagMap2000 software. Lag bars or clovers will be used in the same manner as during the EM61/GPS surveys.

To avoid potential interference with data collection, G-858 operators will wear as little ferrous material as possible, and they will remove all nonessential metallic objects from their person. The G-858 field data collection teams will not wear steel-toed and/or steel-shanked boots.

Diurnal corrections will be made to the G-858 data using total field data collected with either a Geometrics G-856 or a separate G-858. Consideration will be given to setting up the base station magnetometer in areas that are free of cultural interferences. Where traveled roads exist near grids, the base station magnetometer will be set up at least 200

feet from the road. The base station magnetometer will be programmed to record magnetic data once every 5 seconds.

5.17.5.4 Local Grid Coordinate System with G-858

This method is the same as the process described in Section 5.17.5.2 for the EM61-MK2 local grid coordinate system survey.

5.18 Personnel Supporting Geophysical Operations

A team that consists of the following resources will perform geophysical surveys:

1. Project Geophysicist
2. QC Geophysicist
3. Geophysical Team
4. Reacquisition Team
5. Geophysical Data Processing Personnel

5.19 Data Resolution and Data Density

Geophysical Teams will utilize the optimal survey lane widths and sampling rates determined for each instrument from the ODDS. Any variation from the parameters will be tested on the ODDS plots or in a site-specific prove-out to validate that the detection capabilities are equal to or better than those achieved using the ODDS parameters.

While field data collection teams will attempt to collect data at the optimal survey lane width, deviations from these lanes cannot be avoided. For lane widths of 2 feet, the maximum allowable distance between sequential survey lines will be 3 feet. For areas that have had 100 percent analog removals completed prior to performing digital geophysical mapping, additional data does not need to be collected to fill in data gaps if at least 98 percent of the accessible portion of the grid is within 2 feet of a data point.

The sampling rates and survey speed will be selected to achieve sufficient along line data density. The total length of all segments along data transects that are more than 0.35 foot from a data point will not exceed 2 percent of the total transect length for a grid-block. [Ref. 18, Appendix E, FVF003]

5.20 Geophysical Data Processing and Records Management

Geophysical data collected in the field will be processed and managed by geophysical data processors. Processing procedures vary depending on the technology/instrument selected for use at a particular site. Detailed processing steps will be developed prior to

beginning fieldwork. The following subsections summarize the field records management and processing steps performed.

5.20.1 Field Records Management

Paper and digital field records (field data forms, field note copies) will be maintained in the on-site project office. All records will be filed such that they can be found using the date they were created and the team who created them. Paper field forms will also be scanned for digital delivery. The preferred method of field data form and field notes storage is on PDA.

5.20.2 Field Data Storage

All geophysical data collected in the field will be stored electronically on field laptop computers and PDAs. Data from the surveys will be downloaded from data loggers at regular intervals to ensure that the work performed will not be interrupted by a lack of storage capacity in the loggers.

5.20.3 Processing of Geophysical Data

Processing of the geophysical data involves two steps, the preprocessing phase, and the Geosoft® Oasis Montaj (Version 6.0 or above; Geosoft) analysis phase. During the preprocessing phase, geophysicists compare the data collected to the field notes to verify the geometry of a grid and the location of the surveyed grid corner stakes. In some cases, the geophysicist will use this opportunity to adjust the survey lines to the actual distance traveled. The geophysicists will also review the data at this phase to verify that there are no data gaps in the data set. Additionally, the field notes will be reviewed to determine if there is any interference such as trees, structures, fences, or metal scrap that might affect the data. Such information will be entered into the project database during this phase.

Any data collected with RTK GPS systems will be checked to ensure RTK quality was maintained for the entire survey. Differentially corrected data will be considered acceptable for short periods of time if the differentially corrected positions appear to be consistent with the RTK positions at the times when the RTK quality is lost and where it is reestablished.

Following the preprocessing phase, the Project Geophysicist will conduct analysis of the geophysical data using Geosoft. This software consists of a graphical user interface, a high-volume database, and a cross-section of built-in data import, processing, analysis, visualization, mapping, and integration capabilities. The Geosoft platform allows a processor to edit maps interactively, apply dynamic linking to maps, and track the map creation process. Visual data links are used to connect data in the spreadsheet, profile, and map views. Data processing is achieved through the application of Geosoft eXecutable functions, which control all aspects of the data processing sequence and environment.

During the Geosoft processing phase, non-GPS data will be translated from local grid coordinates into NAD83 California State Plane Zone IV coordinates. Data corrections and filtering will then be performed on all of the data as necessary. As discussed previously, filtering and corrections will depend on the type of instrument used for the survey. Some examples of filtering and corrections are:

- Heading corrections (compensating for slight variations in magnetic gradient with direction of travel)
- Time corrections (compensating for time stamp delays in the data recorders)
- Sensor offset corrections
- Diurnal corrections (adjusting for daily fluctuations in magnetic field)
- Leveling of the data to a common baseline
- Low-pass filtering to reduce high frequency noise
- Non-linear filtering (removes data spikes and data "drop-outs")

After all processing steps, raw data and filtered/processed data will be viewed in profile form over top of one another to clearly see the affect the filtering and processing had on the original data. After processing is complete, gridding and contouring of the data will be performed in preparation for anomaly selections.

Database entries will be performed for both preprocessing and for Geosoft analysis; the database provides real time tracking of all data sets from the raw to final dig sheets. The database details all stages of the processing methodology. This includes such information as the leveling procedure, heading corrections, filters used, dates that the data were inspected by the QC Geophysicist, dates that the data were processed, the data coordinate system, the data file names, and any other information pertinent to the processing of the data file.

5.21 Data Delivery

No later than three workdays after collection, Project Geophysicist will furnish each day's raw data and no later than five workdays after collection, processed data will be transmitted to the QC Geophysicist for inspection. All data will be processed into ASCII file format. Each ASCII file format data field will be separated by a space. Each ASCII file of processed data will contain a header describing the type of data, grids covered in the file, when collected, where collected, data column descriptions, data collection interval, and line spacing for each file. Corrections such as for navigation, instrument bias, and diurnal magnetic shift will be applied and any additional processing will also be included in the header.

Separate geophysical data files will be provided for grid blocks. The data will be presented in delineated fields as x1, y1, x2, y2, and z where x1 and y1 are in NAD 1983 State Plane Coordinates, California Zone IV, Feet and x2 and y2 are the local Cartesian grid coordinates referenced to the southwest corner of each local grid block (or 0, 0). The

z column(s) will be the instrument reading(s) and the number of columns present will be instrumentation-dependent. Local Cartesian coordinates will only be included when the survey navigation method uses local coordinates.

5.22 Methodology for Selecting Anomalies

Only trained processors working under the oversight of the Project Geophysicist are responsible for evaluating the geophysical data and preparing "dig lists" with anomaly target "picks."

Following the Geosoft processing/filtering phase, the processors focus on picking all subsurface anomalies that are above background levels. Background levels can vary depending on the geology, the soil moisture content, and the terrain. Surface features such as fences and corner stakes can also affect background levels. For these reasons, the processor frequently refers to the field notes of the data collection teams so that potential subsurface anomalies are not confused with abrupt changes in soil conditions and surface features.

In order to thoroughly review data during the anomaly target picking process, the geophysical teams utilize the following as ways of viewing the data and making anomaly selections:

- Data tables (raw, processed/filtered)
- Sensor data profiles
- Color contours of sensor responses
- Overlay of data profiles on contour maps

5.23 Instrument Standardization Checks

The quality of geophysical data sets is dependent on the operational capabilities of the equipment used. By manufacturer's design, these instruments are calibrated at the time of manufacture and do not require field calibration. To ensure that equipment is fully capable and will perform in accordance with the manufacturer's specifications, Geophysical Survey Teams will perform standardization checks. Following these checks, any equipment that is found unsuitable will be immediately removed from service. These checks will provide QC data indicating the proper functionality of the instruments.

5.23.1 Positioning Equipment Checks

Positioning equipment will be checked for proper operation by placing the system's GPS antenna over a known point and recording the calculated location. For GPS units using RTK corrections from a dedicated base station, the position repeatability standard will be ± 0.5 feet. The repeatability standard for real time code corrected GPS systems is 3 feet.

When code corrected GPS units are used, the PDOP, a unit-less measure of how good the geometry is between the satellite receiver and the satellites being used to calculate a position) threshold will be set at no more than 8. This PDOP setting will ensure that positions recorded are accurate to within ± 3 feet.

5.23.2 Geophysical Sensor Checks

The daily instrument checks will involve three tests: a static test, a cable shake test, and an instrument standardization test.

The static test will involve collecting at least 1 minute of data with the equipment stationary once per day prior to collecting data. The static test criteria is a deviation from maximum to minimum over a one minute period of less than 1.5mV (EM61-Mk2), or 1.5 nT (G-858). If a full analog removal has been performed on the grid the standard will be relaxed to 2.0mV (EM61-Mk2) over a one-minute period.

The cable shake test will be performed once per day prior to data acquisition. One team member will move the instrument cables to test for shorts and broken pin-outs, shaking the cable starting on one end and proceeding to the other. The second team member will look for data spikes in the instrument response during the cable shake test. If the cable-shake test results in instrument responses above the background noise level, the faulty cables or connectors will be replaced prior to data collection.

The instrument standardization test will be performed at a minimum before and after surveying each block. The instrument will be placed over a standard item near that day's survey location. The standard item will remain in the same location until the block of grids has been completely surveyed. Standardization test data will be reviewed immediately following the test by the geophysical team as well as later by the data processors. A QC problem will be indicated by a change of +/- 20 percent or more of the response when operated over the standard. The background values observed during each test will be subtracted from the instrument response before the pre-operational test is compared to the post-operational test. If a QC problem is indicated, the Project Geophysicist will immediately be notified and a determination will be made concerning the operability of the instrument. If the cause cannot be determined by the Project Geophysicist in the field, the unit will be removed from the field. If the instrument is found to be malfunctioning, it will be removed from service and replaced or repaired.

5.24 Reacquisition of Anomalies

Using selected anomaly pick lists, reacquisition teams will mark anomaly excavation points. The following describes how dig sheets are developed and requirements for ground truth of the pick list.

5.25 Dig Sheet Development

Once a grouping of anomaly targets has been reacquired, dig sheet information will be developed by the geophysical data processors and given in digital form to the SUXOS for transfer to the intrusive investigation teams. All successfully reacquired anomalies and at least 10 percent of unsuccessfully reacquired anomalies will be investigated. The dig sheets will be provided to the reacquisition and intrusive UXO Teams in digital format and will contain at a minimum:

- Project Site
- Grid Identification
- Unique Anomaly ID
- Predicted Anomaly Eastings and Northings in NAD 1983 State Plane Coordinates, California Zone IV, Feet
- Maximum Amplitude of Anomaly Signal (where applicable)
- Blank spaces for: Distance and Direction to Contact from Marked Location, Depth to Item, Description of Item, Weight of Item, General Orientation of Item

5.26 Feedback Process (Comparison of Dig Sheet Predictions with Ground Truth)

After dig-sheets have been filled out and returned to the SUXOS by the intrusive teams, the Project Geophysicist will review the results of the intrusive investigation. An assessment will be made as to whether the item(s) found was sufficient to produce the amplitude or type of anomaly in the data. If it is determined that the item was likely not the entire source of the anomaly, the anomaly and anomalous area will be reacquired (if possible) and reinvestigated using the instrument utilized during the initial survey. Anomalies of this type will be tracked separately in the database in the event that future analysis is required.

5.27 Geophysical QC Surveys

After completion of the initial geophysical survey, reacquisition and excavation of anomalies, geophysical QC surveys will be conducted in all grids where digital geophysical data was collected. These surveys will consist of:

QC-1: **Verification of anomaly removal at each anomaly selected for excavation.**

QC-2: **Resurvey a percentage of each grid and excavate selected anomalies.**

QC-3: **Conduct analog survey of at least 10 percent of each grid (area).**

QC-1 Digitally Check Excavations

Quality Control of the excavated anomalies will be performed after the intrusive work is completed at the anomaly location. The area within at least a 3-foot radius of each excavated anomaly location will be checked with the original survey equipment to ensure that the anomaly has been satisfactorily investigated. The maximum amplitude responses in the area will be recorded and checked against the original anomaly amplitudes. If the source of the anomaly does not appear to have been removed, the intrusive operation at that location will be considered as "failed" and the location will require reinvestigation by the intrusive team.

The following procedures should be followed when performing the QC-1 post-excavation check:

- Scan the area within at least a 3-foot radius of the flag with a digital geophysical instrument used in the initial survey.

- Monitor the instrument response looking for the anomalies. If an anomaly is located, record the peak response and the distance and direction from the flag on the PDA (even if the anomaly peak is more than 3 feet from the flag). Do not move the flag. If no anomaly is located, record this in the PDA.

- Record pertinent comments about the excavation location in the PDA.

- Remove all flags in the grid, except SCA flags and those with remaining anomalies.

If there are a large number of anomalies in a particular grid (over 100), the Project Geophysicists will have the option to have the entire grid resurveyed, as opposed to checking each anomaly location. This will be done to reduce the amount of time spent on quality control of the grid. The QC Geophysicist will compare results of the QC survey with the original survey results to determine whether the sources of the anomalies were removed during the intrusive operations.

Excavation locations with significant anomalies remaining after completion of intrusive activities will be reinvestigated unless the source of the anomaly was intentionally left in place. If the pin flag marking the excavation location cannot be found, use the RTK GPS to relocate the excavation location and replace the missing flag. If large numbers of flags are missing, all remaining flags in a grid may be completed before replacing the missing flags. The comment field on the PDA form should be used to note all replaced flags.

QC-2 Geophysical Step Down

Quality control surveys will be performed after intrusive operations have been completed. The methodology for performing the QC survey is as follows:

Step 1: As a minimum, 5 percent of the grids (not less than 3 grids) in an MRS will receive a 100 percent geophysical QC survey. If any of the grids in the 5 percent fail the geophysical QC survey, the failed grid will be resurveyed. Also, an additional grid (one

for each grid that fails) will receive a 100 percent QC survey. The process will be repeated until the original number of grids selected has passed the 100 percent QC survey.

Step 2: After step 1 is satisfied, the next 5 grids in an MRS selected for a geophysical QC survey will receive a 30 percent QC survey. If any of the 5 grids fail the geophysical QC survey, the failed grid will be resurveyed. Also, an additional grid (one for each grid that fails) will receive a 30 percent geophysical QC survey. The process will be repeated until 5 grids have passed the 30 percent QC survey.

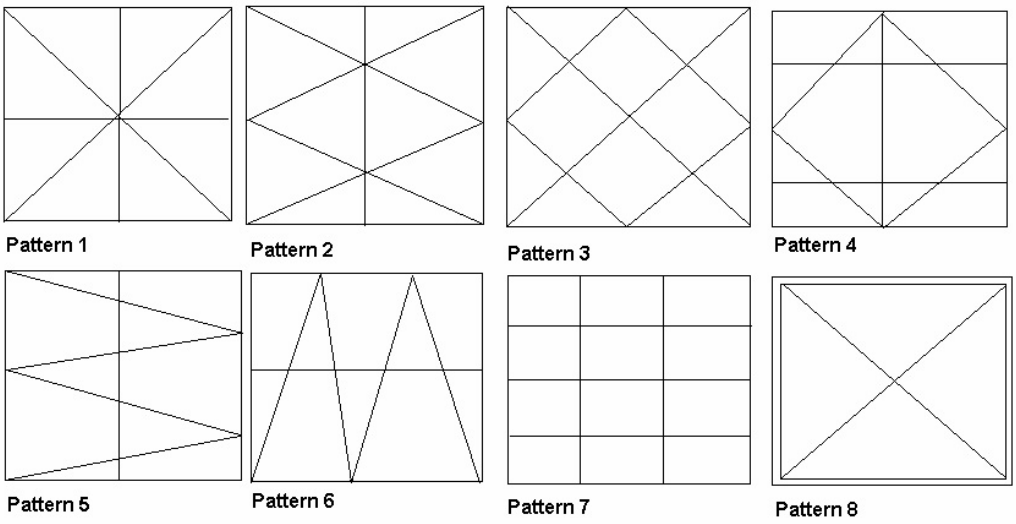
Step 3: Once steps 1 and 2 have been satisfied, the next 5 grids selected for geophysical QC survey will receive a 20 percent QC survey. If any of the five grids fail the geophysical QC survey, the failed grid will be resurveyed. Also, an additional grid (one for each grid that fails) will receive a 20 percent QC survey. The process will be repeated until 5 grids have passed the 20 percent QC survey.

Step 4: Once steps 1, 2, and 3 have been satisfied, the remainder of the grids in the MRS will receive a 10 percent geophysical QC survey. If any grid fails the geophysical QC survey, the failed grid will be resurveyed.

Since work associated with this plan will be conducted at point locations and polygons of various sizes, areas involving a single point location and polygons encompassing less than 2,500 square feet will not undergo this QC step-down protocol. These areas will have a QC inspection of 100 percent of the area.

Any grid that fails the QC Survey in any of the above steps and is subsequently resurveyed, will require an additional 10 percent QC (QC-3) inspection and will have passed prior to being released for QA.

Step-down quality control surveys will be performed with the instrument type used to initially survey the grid. The surveys will be performed in parallel contiguous lanes in the same manner as the initial survey or by pattern, using one of the patterns illustrated below.



A failure at any of the above steps will be constituted by the discovery of a UXO or UXO-like item, or five re-acquirable anomalies as a result of the QC survey, sufficient in size to represent a 37mm projectile or larger, or the discovery during the QC process of five nonselected anomalies that should have been selected during the initial survey.

QC-3 Analog Instrument QC Surveys

An additional 10 percent QC survey will be performed, using the analog (or "mag and flag") instrument determined to be most effective from the ODDS, for all grids originally surveyed digitally. The instrument typically used for this type of QC survey at the former Fort Ord has been the Schonstedt 52/Cx; however, it will be replaced with a different tool if the ODDS results reveal a significantly better instrument. The discovery of any UXO or UXO-like item sufficient in size to represent a 37mm projectile or larger will constitute a failure of the grid (area) being investigated.

This Geophysical QC Survey process is defined in the Field Variance Forms (SEA029, PWP005, SEA030 REV 2) included in the Final TIP MRS-SEA.1-4 [Ref. 18, Appendix E].

5.28 Seeding Program

Seed items will be used to measure instrument detection capability. Known seed items will be used as a navigation QC check during data processing. Blind seed items will be used by QC and QA personnel to ensure the investigation is meeting the data quality objectives (DQOs). The following sections discuss the seeding program.

5.28.1 Known Seed Items

Positional accuracy will be monitored daily during the EM61-MK2 instrument latency test. The QC standard metallic spike will not be placed in the grid blocks. The QC spike will be place on a wooden QC stand for the duration of a grid block survey. This eliminates the need for QC spikes to be placed in the grid. There is also less chance that a QC spike will be interpreted as an anomaly selected for digging or that it will mask another anomaly nearby.

In addition, QC seed items will be used during the production geophysical data collection to quantify positional accuracy of each dataset. The QC seed items will consist of 6-inch rebar spikes or equivalent inserted vertically at the surveyed grid node intersection at a frequency of approximately one per acre. The location of these spikes will be recorded during the grid node survey.

The digital anomaly response from the QC item will be identified during data processing and analysis. Each seed item will be reviewed to quantify positional accuracy by measuring the anomaly target location to the actual geo-referenced location of the rebar spike recorded during the grid survey. The measured offset will be logged for each dataset in the geophysical processing form spreadsheet. Offset distance between the

anomaly target selection and the actual seed location will not exceed the reacquisition metric. One seed item per DGM dataset is anticipated as part of the seeding program.

The known seed item process, is as defined in the Field Variance Form (SEA005) included in the Final TIP MRS-SEA.1-4 [Ref. 18, Appendix E].

5.28.2 Blind Seed Items

Blind seed items will be placed at an interval of at least one seed per acre within data gap areas planned for investigation. The project UXOQCS in consultation with the RPM and Project QA Representative will determine the locations of the seed items.

All seeds will be located using a survey grade GPS or equivalent within DGM grids. The blind seeds will consist of inert MEC items or equivalent buried no greater than the depth interval at which a 100 percent probability of detection was determined for the geophysical instrumentation to be used in that area. The location of the seed items will not be known to the on-site project personnel. QC and QA personnel will review the DGM data against the seed locations. The blind seeds will be detected within the reacquisition metric of the seed survey location.

Blind seed items will also be placed in Mag and Dig grids as a quality indicator. The UXOQCS will seed the MD items in randomly selected removal grids. The location of the seed items will be recorded in the QC log based on X/Y position and grid ID. The seed item location will be revisited by the UXOQCS during re-collection surveys in each seeded grid to ensure the seed item was detected and removed by the UXO Teams.

5.29 After-Action Report and Maps

The After-Action Report and maps to be delivered for each site will include at a minimum:

- Description of work performed and procedures/methods employed to perform the work. This will include target listings generated from digital geophysical interpretations and the results of the intrusive investigations of those targets
- Pseudo-color maps representing the data collected
- Copies of field data and final data
- Copies of individual target lists and maps/drawings for each grid
- A summary of QC check results
- Description of problems encountered and how they were resolved
- Accident exposure data, including man-hours worked, miles driven, and aircraft flights taken to support the work

5.30 Preparation of Geophysical Maps

Maps prepared by GIS staff from the data for the geophysical investigations will include color contour maps of the geophysical data, QC color contour maps, and traverse line maps.

The color contour maps allow a complete presentation of the processed geophysical data across the entire area investigated. The QC color contour maps display the same information for areas where the 10 percent QC surveys have been performed with digital equipment. The traverse line maps show the coverage of the geophysical instruments over the area.

The color contour maps of the processed geophysical data will also be divided into smaller grid sets and presented as an 8½- by 11-inch series. This large-scale map series will include both color contour geophysical data and the QC color contour geophysical data. These maps will be provided in digital format only.

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6.0 SITE SAFETY AND HEALTH PLAN

The purpose of this Site Safety and Health Plan (SSHP) is to establish general guidelines and procedures to ensure protection of LFR Team and subcontractor personnel and the public while performing operations at the former Fort Ord. The plan assigns responsibilities, establishes procedures, and develops contingencies that may arise while operations are performed.

The provisions of this plan are mandatory for all on-site activities undertaken by the LFR Team and its subcontractors. All site activities will comply with applicable federal and California requirements. As site conditions change, this plan may need to be modified. Such modifications will be submitted as SSHP addenda and will be numbered sequentially. All SSHP addenda must be reviewed and approved by the Project Health and Safety Officer. All LFR Team personnel and subcontractors must read and understand this SSHP and sign the Plan Acceptance Form prior to the start of work at the site.

6.1 Introduction

The Site Compliance Checklist (Appendix E) will be used by the UXOSO to conduct the project's monthly safety audit. A copy of the checklist will be given to the RPM, RPM the program-certified industrial hygienist, and the UXOSO. Noncompliance issues will be corrected promptly and reported to the individuals receiving the compliance checklist.

6.2 Project Team Responsibilities

Ensuring the safe and healthful conduct of site operations is the responsibility of everyone assigned to the site. The LFR Team and subcontract personnel involved in site activities are responsible for the following:

- Complying with this SSHP and all other required safety and health guidelines
- Taking all necessary precautions to prevent injury to themselves and to their fellow employees
- Continually being alert to any potentially harmful situation and immediately informing the UXOSO of any such identified conditions
- Performing only those tasks that they believe they can do safely and have been trained to perform
- Preventing spillage and splashing of materials to the greatest extent possible
- Practicing good housekeeping by keeping the work area neat, clean, and orderly
- Immediately reporting all injuries, no matter how minor, to the UXOSO
- Maintaining site equipment in good working order and reporting defective equipment to the UXOSO

- Properly inspecting and using the personal protective equipment correctly

6.2.1 Employee Safety Responsibilities

All operations and personnel having the potential for exposure to site hazards are subject to the requirements of this SSHP. Work will not be performed in a manner that conflicts with the safety, health, or environmental precautions outlined in this plan. All site personnel, including any LFR Team subcontractors, who have the potential for exposure to site hazards, are subject to the requirements of this SSHP. Personnel violating safety procedures are subject to dismissal/removal from the project site. Roles and responsibilities for site personnel are summarized in the following subsections.

The following sections describe the roles and responsibilities of the key WESTON team members that will be responsible for field activities. These key team members are also shown on the LFR Team Organization Chart (Figure 2-2).

6.2.2 Remediation Project Manager

Ms. Linda Temple will serve as the Remediation Project Manager for the activities covered under this work plan. She has overall responsibility for the management and completion of the project, which includes resource allocation, financial reporting, schedule control, and review and approval of deliverables.

6.2.3 Project Health and Safety Manager

The Project Health and Safety Manager (PHSM) for this project is Mr. Mike Stuart. The PHSM has the following responsibilities.

- Review and final approval of the SSHP.
- Ensure that the SSHP complies with all federal, state, and local health and safety requirements.
- If necessary, modify specific aspects of the SSHP to adjust for on-site changes that will affect safety.
- Evaluate and authorize and changes to the SSHP.
- Implementation and oversight of the Health and Safety Program.
- Assist in acting as liaison with government officials regarding health and safety-related issues.
- Maintain frequent communication with the Site Safety and Health Officer (UXOSO) regarding site activities and implementation of the SSHP. Assist in training site personnel in the site-specific hazards.
- Ensure that both the site and site personnel comply with the Safety Program and all other applicable plans.

6.2.4 Senior UXO Supervisor

Mr. Bruce Moe will serve as the SUXOS and will manage field operations in accordance with project requirements. The SUXOS is responsible for coordinating and supervising all site activities.

6.2.5 Unexploded Ordnance Safety Officer

The UXOSO will be responsible for implementing the SSHP and ensuring that all project personnel follow the requirements of the SSHP. In addition to overall site safety, he will also be responsible for enforcing UXO safety as it applies to MEC operations.

The UXOSO will be responsible for conducting the morning safety meeting for all site personnel to discuss the day's activities, associated hazards, and MEC safety. He will also be required to report any incidents that occur on site to the PHSM. He will be required to implement safety corrective actions through training and reinforced awareness.

6.2.6 Subcontractors

Qualified subcontractors and associate personnel may be brought on site for specialty services that may include, but are not limited to: surveying, heavy equipment delivery and removal, vegetation removal, and demolition. These subcontractors will be under the ultimate direction of the SUXOS and are required to adhere to all aspects of the SSHP.

6.3 Unknown Filler

In the event munitions suspected of containing unknown filler is encountered, refer to Section 6.6.5 of the PWP [Ref.1].

6.4 Field Activities

The fieldwork will generally consist of mobilization, site preparation, excavation operations, MEC operations, and demobilization. These major activities can be summarized as follows:

Activity 1: Preliminary Activities

This task includes the mobilization of personnel, equipment, and supplies to the project site and setup of office and storage areas.

Activity 2: Site Preparation Activities

This task includes site surveying to delineate work areas and setup the excavation and screening/sifting system.

Activity 3: Excavation/Earth Moving Activities

This task includes grubbing the area within the limits of grading for the roadway alignments, and removal of soil in special case areas as needed to reduce magnetic clutter or remove anomalies.

Activity 4: Digital Geophysical Mapping Survey Activities

This task includes the DGM survey of approximately 35 acres. The first step will be the implementation of the Geophysical Test Plot. The DGM will be accomplished by using a towed array configuration. An ATV will be used to tow the DGM equipment across the survey area. Man-portable analog systems will also be utilized.

Activity 5: MEC Operations

This task includes MEC safety escort activities, sifting operations to remove potential MEC, excavation and removal of potential MEC anomalies, and destruction/disposal of MEC and scrap materials.

UXO technicians II will inspect work areas prior to performing survey or clearing operations for hazardous MEC items as well as escort any visitors during work activities.

The UXOSO coordinates access control and security on site during all MEC operations. Except for low risk MEC escort activities, only essential personnel will be allowed in the work zone. The work zone is the work site, and encompasses an area large enough to prevent personnel injuries from fragmentation resulting from unintentional or intentional detonations.

During on-site operations, the SUXOS will order operations to cease if nonessential personnel are observed within the operating area. To ensure safety, site controls include the following:

- Eating, drinking, and smoking are prohibited except in designated areas.
- Hazardous MEC operations cease if nonessential personnel are present.
- The SUXOS, UXOSO, or their designee escorts authorized site visitors.
- All personnel entering the site, including visitors, will wear the proper PPE and sign in and out on the site visitor's log.
- The UXOSO maintains the Site Control Log to ensure accurate accountability of personnel on site.

The UXOSO provides a SSHP/MEC safety briefing to all personnel entering the site to inform them of potential site hazards. All personnel must acknowledge this briefing by signing the SSHP Review Form.

In case of an emergency, personnel exit the site and move to a designated safe area. The UXOSO will determine the designated safe area that is located upwind of the site outside of the fragmentation area. The SUXOS will notify the site manager if an emergency warrants site evacuation.

Activity 6: Closeout Activities

This task includes the restoration of work areas and the demobilization of all remaining equipment, temporary structures, and other items from the project site after project completion.

6.5 Hazard Analysis and Risk Assessment

Safety, biological, and physical hazards will present a risk to workers at former Fort Ord sites. The level of risk is dependent upon the type of work being done. The paragraphs that follow describe the safety, biological, and physical hazards associated with planned activities.

6.5.1 Safety Hazards

The major safety hazard for operations performed at former Fort Ord sites is the unintended detonation of ordnance. Other anticipated safety hazards include heavy equipment operation, excavation safety, slip hazards, and power tool use. Procedures to minimize these hazards are presented below.

6.5.1.1 MEC

Ordnance and ordnance-related items will be encountered at the former Fort Ord site. Personnel must be alert for MEC and munitions debris. All field personnel must observe the following general safety precautions:

- DO NOT touch or move any MEC until positive identification has been determined, regardless of the markings or apparent condition.
- DO NOT visit an ordnance site if an electrical storm is occurring or approaching. If a storm approaches during a site visit, leave the site immediately and seek appropriate shelter.
- DO NOT use radios or cellular phones in the vicinity of suspect MEC.
- DO NOT walk across an area where the ground cannot be seen. If dead vegetation or animals are observed, leave the area immediately due to potential contamination by chemical agent.
- DO NOT drive vehicles into areas suspected of MEC. Use clearly marked lanes.
- DO NOT rely on color code for positive identification of MEC nor their contents.
- SMOKING will only be allowed in smoking areas designated by the SUXOS during the morning Tailgate Safety Briefing.
- Approach ordnance items from the side.
- Prohibit unnecessary personnel from visiting the site.

- Decontaminate the vehicle interior when deemed necessary to prevent the spread of poison oak oils and sap.
- Always assume MEC contain a live charge until it can be ascertained otherwise.
- The following precautions are applicable to personnel performing MEC recovery and demolition operations.
- All MEC will be identified independently by two (2) UXO Technicians.
- All MEC operations will use the "Buddy" system.
- Demolition operations will as a minimum conform to TM 60A-1-1-31.
- DO NOT dismantle, strip, or handle any MEC unnecessarily.
- Avoid inhalation and skin contact with smoke, fumes, dust, and vapors of detonations and residue from MEC.
- DO NOT attempt to extinguish burning explosives or any fire, which might involve explosive materials.
- DO NOT manipulate external features of MEC unless specifically called for in an Explosive Ordnance Disposal (EOD) procedure.
- Incorporate appropriate property and personnel protective measures for shock and fragmentation when conducting MEC operations.
- Do not subject MEC 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.
- Dispose of white phosphorous (WP) munitions in accordance with the direction of the UXO Safety Specialist.
- Do not transport damaged WP munitions unless fully submerged in water.
- Avoid unnecessary movement of armed or damaged MEC.
- Avoid the forward portions of munitions employing proximity fusing.
- Assume unknown fuzes contain cocked strikers or anti-disturbance features.

6.5.1.2 Heavy Equipment

A portion of the work may involve the utilization of backhoes to perform excavation. Injuries can result from equipment hitting or running over personnel or from the overturning vehicles. Vehicle and heavy equipment design and operation will be in

accordance with 29 CFR parts 1926.600 through 1926.602. In particular, the following precautions will be used to help prevent injuries:

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices being checked by the vehicle operator at the beginning of each shift
- Cabs will be kept free of all nonessential items, and all loose items will be secured
- Glass in windshields, windows, and doors will be safety glass. Any cracked or broken glass will be replaced
- Backhoes will be provided with necessary safety equipment (seat belts, rollover protection, emergency shut-off in case of rollover, and backup warning lights and audible alarms)
- Blades and buckets will be lowered to the ground, and parking brakes will be set before shutting off any heavy equipment or vehicle
- Backhoes will not be backed up unless:
- The vehicle has a reverse signal alarm audible above the surrounding noise level
- The vehicle is backed up under the direction of a signalman
- The heavy equipment operator will be trained in the operation of the vehicle. Any person operating a motor vehicle will possess a permit valid for the equipment being used.

6.5.1.3 Excavation Safety

Prior to any excavation activity, efforts must be made to determine whether underground installations (i.e., sewers, telephone, water, fuel, electric lines, etc.) will be encountered and, if so, where such underground installations are located. The UXOSO or designee must contact the utility companies or owners involved and inform them, within established or customary local response times, of the proposed work. If the utility companies or owners do not respond within the period established by law or ordinance, or if they cannot identify the locations of utilities, the excavation may proceed with caution. In this situation, detection equipment or other safe and acceptable means to locate utilities may be used. If underground installations are exposed, OSHA requires that they be removed, protected, or properly supported.

No protective system is needed if the excavation is made entirely in stable rock, or if workers enter an excavation that is less than 5 feet in depth (provided that the competent person, UXOSO, determines that there is no potential for a cave-in). If the depth of the excavation exceeds 5 feet than the sides of the excavation will slope to an angle not steeper than one and one-half horizontal to one vertical (34° measured from the horizontal). Access to and exit from an excavation must comply with the following conditions:

- Trenches 4 feet or more in depth should be provided with a fixed means of egress

- Spacing between ladders or other means of egress will be a minimum of 25 feet laterally
- Ladders must be secured and extend a minimum of 36 inches above the landing
- Metal ladders should not be used when electric utilities are present

6.5.1.4 Slip, Trip, and Fall Hazards

Slip, trip, and fall hazards may be encountered at the site including holes, pits, ditches, steep grades, and uneven grades. Personnel should use caution when traversing the site.

6.5.1.5 Power Tools

By their very nature, power tools have great capability for inflicting serious injury upon site personnel if they are not used and maintained properly. To control the hazards associated with power tool operation, the requirements outlined in EM 385-1-1 and the safe work practices listed below are observed when using power tools:

- Operations are conducted by authorized personnel familiar with the tool, its operation, and safety precautions. Power tools must be operated in accordance with the owner's manual
- Power tools are inspected prior to use and defective equipment is removed from service until repaired
- Power tools designed to accommodate guards have such guards properly in place prior to use
- Loose fitting clothing or long hair is not permitted around moving parts
- Hands, feet, etc., are kept away from all moving parts
- Maintenance and/or adjustments to equipment are not to be conducted while the equipment is in operation
- An adequate operating area is provided, allowing sufficient clearance and access for operation
- Personnel use required protective equipment, such as gloves, chaps, and steel-toed boots when using chainsaws

6.5.1.6 Confined Space Entry

Entry into permit-required confined spaces is not anticipated. Should entry into a permit-required confined space be required, the PHSM will be contacted to provide guidance and training.

6.5.2 Biological Hazards

Biological hazards that are usually found on site include ticks, spiders, poisonous snakes, vermin, and hazardous plants. Depending on the season and weather the hazards at the former Fort Ord will vary. For instance, during cold weather many animals and insects are not active and most plants are dormant. The project may continue through several seasons and the risks and hazards will change with the seasons. Employee awareness and the safe work practices outlined in the following paragraphs should reduce the risk associated with these hazards.

6.5.2.1 Hazardous Plants

A number of hazardous plants may be encountered during field operations. The ailments associated with these plants range from mild hay fever to contact dermatitis. Plants that present the greatest risk to site workers are those that produce allergic reactions and tissue injury.

Plants That Cause Skin and Tissue Injury

Contact with sharp leaves and thorns are of special concern to site personnel. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in skin lesions and the introduction of fungi or bacteria through the skin. This is especially important in light of the fact that the warm moist environment created inside protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes will report immediately to the UXOSO for continued observation and care. Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Plants That Cause an Allergic Reaction

The poisonous plants of greatest concern are poison ivy, poison oak, and poison sumac (Figure 6-1). Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

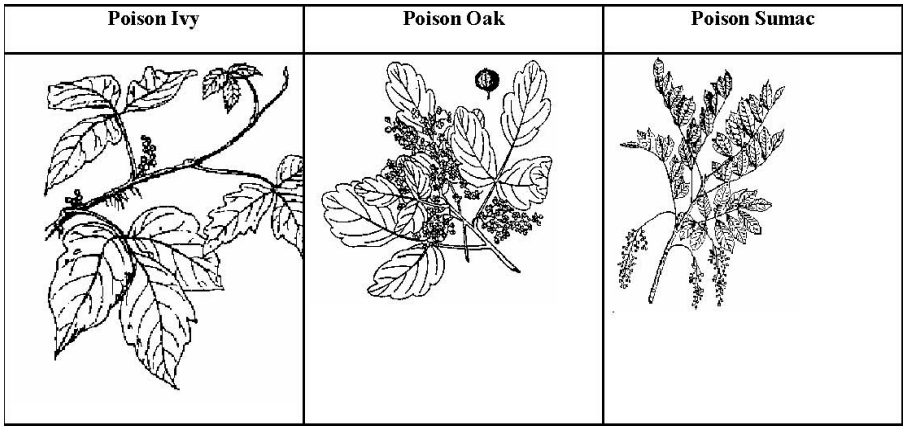
The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Poison sumac is a tall shrub or small tree with 6 to 12 leaflets arranged in pairs with a single leaflet at the end. This plant grows in wooded, swampy areas. The reaction associated with exposure to these plants will generally cause the following signs and symptoms:

- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact
- Reddening, swelling, itching, and burning at the site of contact

- Pain, if the reaction is severe
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin
- If the rash is scratched, secondary infections can occur. Preventive measures that are effective for most site personnel include:
- Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report, and mark poisonous plants found on site
- Wash hands, face, or other exposed areas at the beginning of each break period and at the end of each workday
- Avoid contact with, and wash on a daily basis, contaminated tools, equipment, and clothing
- Barrier creams, detoxification/wash solutions and orally administered desensitization may prove effective and should be tried to find the best preventive solution

Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Figure 6-1
Poison Ivy/Poison Oak/Poison Sumac



6.5.2.2 Tick Bites

The Center for Disease Control has noted the increase of Lyme Disease and Rocky Mountain Spotted Fever (RMSF), which are caused by bites from infected ticks that live in and near wooded areas, tall grass, and brush. Ticks are small, ranging from the size of a comma up to about one quarter inch and are sometimes difficult to see (Figure 6-2). The tick season extends from spring through summer. When embedded in the skin, they may look like a freckle.

Figure 6-2
Tick

Lyme disease has been documented in 43 states with the heaviest concentrations in the northeast (Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania), the upper Midwest (Minnesota and Wisconsin), and along the northern California coast and more specifically, Monterey County. It is caused by deer ticks and lone star ticks that have become infected with spirochetes. Female deer ticks are about one quarter inch in size and are black and brick red in color. Male deer ticks are smaller and completely black. Lone star ticks are larger and chestnut brown in color.

RMSF has occurred in 36 states, with the heaviest concentrations in Oklahoma, North Carolina, South Carolina, and Virginia. It is caused by Rocky Mountain Wood Ticks and Dog Ticks that have become infected with rickettsia. Both are black in color.

The first symptoms of either disease are flu-like chills, fever, headache, dizziness, fatigue, stiff neck, and bone pain. If immediately treated by a physician, most individuals recover fully in a short period of time. If not treated, more serious symptoms can occur.

If you believe a tick has bitten you, or if any of the signs and symptoms noted above appears, contact the UXOSO, who will authorize you to visit a physician for an examination and possible treatment.

Protective Measures

Standard field gear (work boots, socks, and light-colored coveralls) provides good protection against tick bites, particularly if the joints are taped. However, even when wearing field gear, the following precautions will be taken when working in areas that might be infested with ticks:

- When in the field, check yourself often for ticks, particularly on your lower legs and areas covered with hair
- Spray outer clothing, particularly your pant legs and socks, BUT NOT YOUR SKIN, with an insect repellant that contains permethrin or permanone
- When walking in wooded areas wear a hard hat and avoid contact with bushes, tall grass, or brush as much as possible

- If you find a tick, remove it by pulling on it gently with tweezers. Do not squeeze the tick's body. Grasp it where the mouthparts enter the skin and tug gently, but firmly, until it releases its hold on the skin
- If the tick resists, cover the tick with salad oil/Vaseline for about 15 minutes to asphyxiate it, then remove it with tweezers
- DO NOT use matches, a lit cigarette, or nail polish or any other type of chemical to "coax" the tick out
- Be sure to remove all parts of the tick's body and disinfect the area with alcohol or a similar antiseptic after removal
- For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash that looks like a bulls-eye or an expanding red circle surrounding a light area, frequently seen with a small welt in the center
- Also look for the signs of the onset of RMSF, such as an inflammation, which is visible in the form of a rash comprising many red spots under the skin, which appears 3 to 10 days after the tick bite

6.5.2.3 Insects

Contact with stinging insects may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. Poisonous insects and insect-like creatures that may be encountered at the former Fort Ord include the following:

- Bees ("Killer" bees, honeybees, bumblebees, wasps, hornets, and wingless wasps)
- Scorpions
- Fire ants

Bees

Personnel should be very cautious of "killer" bees. They have the appearance of the typical honeybee; however, they are very aggressive. These Africanized honeybees defend their colonies much more vigorously than typical bees. The colonies are easily disturbed (sometimes just by being nearby). When they do sting, many more bees may participate, so there is a danger of receiving more stings. This can make them life threatening, especially to people allergic to stings, or with limited capacity to escape (the young, old, and handicapped).

Scorpions

The scorpions commonly found in California have the capacity to inflict a painful sting, however, they are not considered to pose a danger to humans. Stings by these scorpions can be managed by washing the wound with soap and water and by application of an ice pack for a few minutes. Medical attention is usually not needed unless the victim is displaying signs of an allergic reaction (rash, severe swelling, shortness of breath).

Fire Ants

Fire ants are aggressive, reddish-brown to black ants that are 1/8 inch to 1/4 inch long. They construct nests, which are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and 1 1/2 feet in height. In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields, and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors.

Fire ants use their stingers to immobilize or kill prey and to defend ant mounds from disturbance by larger animals, such as humans. Any disturbance sends hundreds of workers out to attack anything that moves. The ant grabs its victim with its mandibles (mouthparts) and then inserts its stinger. The process of stinging releases a chemical, which alerts other ants, inducing them to sting. In addition, one ant can sting several times without letting go with its mandibles.

Once stung, humans experience a sharp pain that lasts a couple of minutes, then after a while the sting starts itching and a welt appears. Fire ant venom contains alkaloids and a relatively small amount of protein. The alkaloids kill skin cells; this attracts white blood cells, which form a pustule within a few hours of being stung. The fluid in the pustule is sterile, but if the pustule is broken, the wound may become infected. The protein in the venom can cause allergic reactions that may require medical attention.

Some of the factors related to stinging insects that increases the risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities
- The nests can be situated in trees, rocks, bushes or in the ground, and are usually difficult to see
- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention

- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth, and respiratory passages
- The hypersensitivity needed to cause anaphylactic shock, can in some people, accumulate over time and exposure; therefore, even if someone has been stung previously, and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again
- With these things in mind, and with the high probability of contact with stinging insects, all site personnel will comply with the following safe work practices:
- If a worker knows that he is hypersensitive to bee, wasp, or hornet stings, he must inform the UXOSO of this condition prior to participation in site activities
- All site personnel will be watchful for the presence of stinging insects and their nests, and will advise the UXOSO if a stinging insect nest is located or suspected in the area
- Any nests located on site will be flagged off and site personnel will be notified of its presence
- If stung, site personnel will immediately seek shelter and stay there even if some bees come in with you (there are more outside the building or car). Do not jump in water (bees will still be in the area when you come up). Once safe, remove stings from your skin, it does not matter how you do it, but do it as quickly as possible to reduce the amount of venom they inject. Obtain first aid treatment and contact the UXOSO who will observe for signs of allergic reaction
- Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person at all times

6.5.2.4 Snakes

Snakes like to sun themselves on rocks during the day. Therefore, when site activities are conducted, extreme caution must be exercised around areas where snakes might be found (i.e., rocks, bushes, logs, or in holes, crevices, or abandoned pipes). The rattlesnake is the only type of snake in California that is dangerous to humans. These snakes are normally not aggressive and will flee when humans approach. However, if a rattlesnake is encountered, leave the area and report the location to UXOSO. The UXOSO will issue protective clothing, such as snake leggings, to site personnel.

Western Rattlesnake

This is the only rattlesnake that can be encountered in Northern California. Its venom, which it uses to immobilize its prey and defend itself, contains both neurotoxins and hemotoxins. Neurotoxins affect the nervous system and hemotoxins affect the bloodstream. Its size can vary between 1.25 and 5.25 feet and can be identified by brownish blotches down midline of back; generally edged with dark brown or black. The snake is most active between the months of April and October.

Treatment

A snake bite is usually characterized by extreme pain and swelling at the site of the bite; the presence of one or more puncture wounds created by the fangs; and a general skin discoloration. The manifestations of the bite include general weakness, rapid pulse, nausea and vomiting, shortness of breath, dimness of vision, tingling or numbness of the tongue, mouth or scalp, and shock.

Physical reactions are aggravated by acute fear, anxiety, the amount of venom injected, the speed of absorption of venom into the victim's circulation, the size of the victim, protection provided by clothing (including shoes and gloves), the amount of time before anti-venom therapy, and location of the bite.

First Aid

The rules to follow for a snake bite are:

- DO NOT cut "Xs" over the bite area, as this will intensify the effect of the venom
- DO NOT apply suction to the wound since this has a minimal effect in removing venom
- DO NOT apply a tourniquet since this will concentrate the venom and increase the amount of tissue damage in the immediate area
- DO NOT use cold compresses, ice, dry ice, chemical ice packs, spray refrigerants, or other methods of cold therapy
- If possible, try to get a good look at the snake so it can be identified for proper selection of anti-venom
- DO NOT allow the victim to run for help since running increases the heart rate and will increase the spread of the venom throughout the body
- Reassure and keep the victim calm, quiet, and immobile. Do not delay evacuation
- Have the victim hold the affected extremity lower than the body while waiting for medical assistance
- Transport the victim to medical attention immediately

Identification Features

Nonpoisonous snakes are often erroneously identified as poisonous. The following features in Table 6-1 will assist in properly identifying a snake as poisonous or nonpoisonous.

Table 6-1
Snake Identification Features

Feature	Poisonous	Nonpoisonous
Eye Pupils	Elliptical, or cat-like	Round
Sensing Pits	Pit between the eyelids and nostrils	No pit between the eyelids and nostrils
Teeth	Two enlarged teeth (fangs) in front of the upper jaw	All teeth are approximately the same size
Scales	Form a single row on the underside and below the tail	Arranged in a double row on the underside of the tail
Head	Head much wider than the neck	Head slightly wider than the neck
Tail	Single anal plate	Divided anal plate

6.5.2.5 Spiders

A large variety of spiders may be encountered during site activities. Extreme caution must be used when lifting logs and debris, since spiders are typically found in these areas.

While most spider bites merely cause localized pain, swelling, reddening, and in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological affects caused by their venom, are dangerous. The UXOSO will brief site personnel as to the identification and avoidance of these dangerous spiders. These species include the black widow and the brown or violin spiders.

The black widow is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the underside of the abdomen (Figure 6-3). The black widow is usually found in dark, moist locations, especially under rocks, rotting logs, and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible)

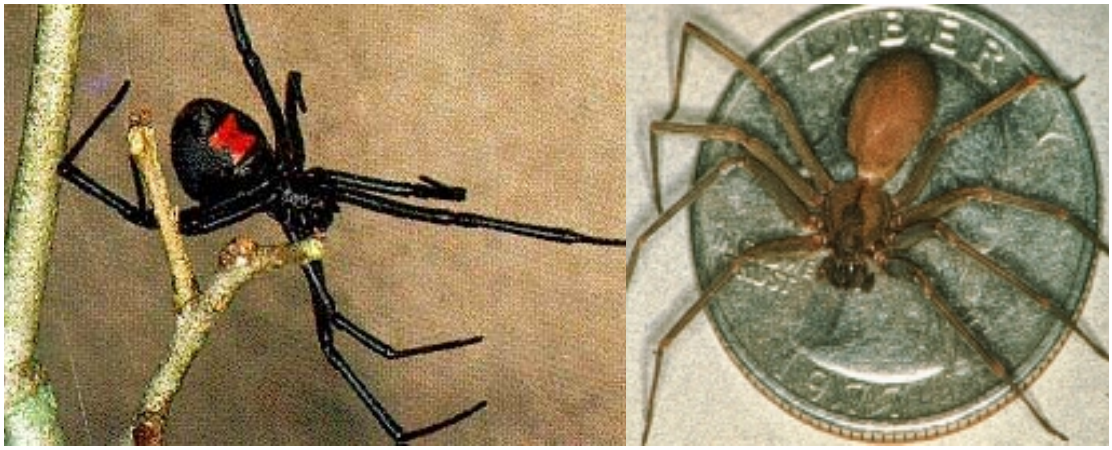
- After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils, and generalized swelling of face and extremities

The brown or violin spider is brownish to tan in color, rather flat, and 1/2 to 5/8 inches long (Figure 6-3). However, unlike the typical species, the ones encountered at the former Fort Ord do not have a violin or "fiddle" shaped mark on the top of the head. Of the brown spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin, and the Arizona violin. The brown recluse spider has not been reported at or near the project area [Ref. 25]. These spiders may be found in a variety of locations including trees, rocks, or in dark locations. Victims of a brown or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, pustulating lesion with a bull's-eye appearance
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea, and vomiting
- Pain may become severe after 8 hours, with the onset of tissue necrosis

There is no effective first aid treatment for either of these bites. Except for very young, very old, or weak victims, spider bites are not considered to be life threatening. However, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

Figure 6-3
Spiders



First aid should include:

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification

- Clean the bitten area with soap and water or rubbing alcohol
- To relieve pain, place an ice pack over the bite
- Keep the victim quiet and monitor breathing
- Seek immediate medical attention

6.5.2.6 Rats, Mice, and Bats

Rats, mice, and bats may be found at the site. These animals may carry rabies and should be avoided. In addition, Hanta Virus is also a concern when coming in contact with these animals. Hanta Virus is a disease spread primarily from infected rodent droppings. Hanta Virus results from intimate contact with rodents, such as may occur in agricultural areas with dense human and rodent populations or during soil excavation. Hanta virus is not transferred from person to person. The overwhelming evidence is that spread is from rodent to humans through contact with infected rodent secretions or airborne transmission by infected dust particles.

Preventive measures should focus on cleaning all cuts and scratches with soap and water, followed by rinsing with hydrogen peroxide. Put liquid skin on the affected areas. The best preventative measure is to avoid all rodent nests during geophysical surveys. If rodent nests are discovered, field team members should be apprised of their locations and avoid working adjacent to the nests. If work must be performed at that location, a 10 percent bleach solution will be sprayed on the nest and adjacent areas to kill the virus. If work must be performed at a location where rodent infestation is evident personal protective equipment should be worn. The PPE ensemble will include:

- Half-face air purifying respirator with high efficiency particulate air (HEPA) filter cartridges (N/P/R99, 100) and non-vented goggles or high filtration dust mask with non-vented goggles
- Tyvek coveralls
- Tyvek boot covers or rubber boots
- PVC or latex gloves

6.5.2.7 Bloodborne Pathogens

Bloodborne pathogens enter the human body and blood circulation system through punctures, cuts, or abrasions of the skin or mucous membranes. They are not transmitted through ingestion (swallowing), through the lungs (breathing), or by contact with whole, healthy skin. Examples of bloodborne pathogens are HIV, Hepatitis B, Malaria, Syphilis, and West Nile Virus. However, under the principle of universal precautions all blood should be considered infectious, and all skin and mucous membranes should be considered to have possible points of entry for pathogens.

Potential blood borne pathogen exposures that employees might face include:

- Contact with contaminated medical equipment or medical waste or sharp instruments
- Medical emergency response operations such as administering first aid or cardiopulmonary resuscitation (CPR)
- Contact with human wastes such as domestic sewage

6.5.3 Physical Hazards

Physical hazards that exist at the former Fort Ord include noise, heat and cold stress, and fire hazards. Procedures to protect workers from these hazards are presented below.

6.5.3.1 Noise Induced Hearing Loss

Planned activities will involve the use of heavy equipment, such as backhoes and generators. The unprotected exposure of site workers to this noise during activities can result in noise-induced hearing loss. Personnel working at this site will be enrolled in a hearing conservation program. The UXOSO will verify that each site worker has received hearing conservation training that entails proper use of hearing protectors. Additionally, the UXOSO will ensure that either earmuffs or disposable foam earplugs are made available to, and used by, all personnel near operating heavy equipment, or other sources of high intensity noise. Hearing protection is required any time the noise level reaches 85 dbA or greater. Double protection is required any time noise levels exceed 104 dbA.

Noise monitoring will be accomplished by field determination. If a person speaking in a normal voice cannot be heard at a minimum 3-foot distance, then hearing protection will be required.

6.5.3.2 Heat Stress

Heat stress is one of the most common (and potentially serious) illnesses that affect site workers. When site personnel are engaged in operations in hot environments, a number of physiological responses can occur which may seriously affect the health and safety of the workers. These affects can be eliminated or controlled through the use of a comprehensive heat stress prevention and monitoring program.

Individuals vary in their susceptibility and degree of response to stress induced by increased body heat. Heat stress can result in health effects ranging from transient heat fatigue to serious illness or death. Heat stress is cause by a number of interacting factors including environmental condition, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses at MEC sites, regular monitoring and other preventive precautions are vital. Factors that may predispose a worker to heat stress include:

- Lack of physical fitness
- Lack of acclimatization to hot environments
- Degree of hydration
- Obesity
- Current health (i.e., having an infection, chronic disease, diarrhea, etc.)
- Alcohol or drug use
- The worker's age and sex

The amount and type of PPE worn influence the worker's heat tolerance. PPE adds weight and bulk, severely reduces the body's access to normal heat exchange mechanisms (evaporation, convection, and radiation), and increases energy expenditure. Therefore, when selecting PPE, each item's benefit should be carefully evaluated in relation to its potential for increasing the risk of heat stress. Once PPE is selected, the safe duration of work/rest periods should be determined based on:

- Anticipated work rate
- Ambient temperature and other environmental factors
- Type of protective ensemble
- Individual worker characteristics and fitness

Sweating does not cool the body unless moisture is removed from the body. The use of PPE reduces the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's effort to maintain an acceptable temperature may become impaired and this may cause heat stress. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks. At the former Fort Ord sites, Level D PPE will be utilized, thus providing minimal increase in the potential for heat stress. Level D PPE is defined as standard work clothes with long pants, hard-hat (when overhead hazard is present), and safety boots (when working around heavy equipment).

Early Symptoms of Heat Stress

The early symptoms used to recognize heat-related illnesses include:

- Decline in task performance
- Lack of coordination
- Decline in alertness
- Unsteady walk
- Excessive fatigue
- Muscle cramps

- Dizziness

Heat Stress Disorders

The following paragraphs outline the major heat-related illnesses that may result from exposure to high heat environments, which include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke (Table 6-2). For the purpose of this program, reference to "liquids" will indicate the use of water or an electrolyte replacement solution.

Heat Rash

Heat rash is caused by continuous exposure to heat and humid air and is aggravated by wet chafing clothing. This condition can decrease a worker's ability to tolerate hot environments. Symptoms include a mild red rash, especially in areas of the body that sweat heavily. Treatment of heat rash entails decreasing the amount of time in protective gear and using baby powder to absorb moisture and decrease chafing. Maintain good personal hygiene standards and change into dry clothes as needed.

Heat Cramps

Heat cramps are caused by a profuse rate of perspiration that is not balanced by adequate fluid and electrolyte intake. The occurrence of heat-related cramps is often an indication that excessive water and electrolyte loss has occurred, which can further develop into heat exhaustion or heat stroke. Symptoms include acute, painful spasms of voluntary muscles such as the back, abdomen, and extremities. Treatment involves moving victim to a cool area and loosening restrictive clothing. Stretch and massage affected muscles to increase blood flow to the area. Have patient drink one to two cups of liquids immediately with fluid intake repeated every twenty minutes thereafter. Consult with physician if condition does not improve. If available, an electrolyte replacement solution should be consumed.

Heat Exhaustion

Heat exhaustion occurs due to the large fluid and salt loss from profuse sweating. It is a state of very definite weakness or exhaustion caused by increased stress on various organs to meet increased demands to cool the body from excessive loss of fluids. This condition leads to inadequate blood supply and cardiac insufficiency. Heat exhaustion is less dangerous than heat stroke, but nonetheless must be treated. If allowed to go untreated, heat exhaustion can quickly develop into heat stroke. Symptoms include: pale and moist skin, profuse perspiration, and extreme weakness. Body temperature is basically normal or slightly elevated. The worker's pulse is weak and rapid, and breathing is often shallow. The individual may have a headache or experience nausea. Treatment for heat exhaustion involves removing the individual to a cool, air-conditioned place, loosening the persons clothing, and elevating the victim's feet. Consult a physician, especially in severe cases. Have patient drink one to two cups of liquids immediately, and repeat every twenty minutes thereafter. Total liquid consumption should be about one to

two gallons per day. If the signs and symptoms of heat exhaustion do not subside, or become more severe, medical attention will be required.

Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by failure of the heat regulating mechanisms of the body. The failure of the individual's temperature control system causes the perspiration system to stop working correctly. When this occurs, the body core temperature rises very rapidly to a point (+105°F) where brain damage and death will result if the person is not cooled quickly. The victim's skin is hot and often dry. Other symptoms include confusion; extremely high body temperature; rapid respiratory and pulse rate; delirium; convulsions; unconsciousness or coma.

Cool the victim immediately. If the body temperature is not brought down quickly, permanent brain damage or death may result. The victim should be moved to a shady area; he should lie down and keep head elevated. Cool the victim by either sponging or immersing the victim in very cool water to reduce the core temperature to a safe level (<102°F). If conscious, give the victim cool liquids to drink. Observe the victim and obtain immediate medical help. Do not give the victim caffeinated or alcoholic beverages. Heat stroke is considered a medical emergency. Medical help should be summoned immediately. **Early recognition and treatment of heat stroke are the only means of preventing brain damage or death.**

Preventive Measures

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat exhaustion, that person may become predisposed to additional heat injuries. In order to avoid heat-related illnesses, proper preventive measures will be implemented whenever environmental conditions dictate the need, normally whenever the temperature reaches at least 75°F. These preventive measures represent the minimal steps to be taken and will include the following procedures:

- The UXOSO will examine each site worker prior to the start of daily operations, and periodically throughout the day, to determine the individual's susceptibility to heat induced stress. Evidence of extreme dehydration may require the UXOSO to restrict the worker's activities until such time as the worker is fit for duty. Personnel identified as being at high risk (obese, using diuretics, etc.) for heat stress that are allowed to participate in site operations will be monitored frequently by the UXOSO
- Site workers will be trained to recognize and treat heat-related illnesses. This training will include recognizing the signs and symptoms of heat stress disorders and knowing proper treatment
- In order to maintain workers' body fluids at normal levels, workers will be encouraged to drink, as a minimum, approximately sixteen ounces of liquids prior to start of work in the morning, after lunch and prior to leaving the site at the conclusion of the day's activities. Disposable four (4) to twelve (12) ounce cups and liquids will

be provided on site. Liquids to be provided will include water and an electrolyte replacement solution, with the intake of each being equally divided. Liquids containing caffeine are to be avoided

- When ambient conditions and site workload requirements dictate, as determined by the UXOSO, workers will be required to drink a minimum of 16 to 32 ounces of liquids during each rest cycle. The normal thirst mechanism is not sensitive enough to ensure that enough water will be ingested to replace lost sweat. When heavy sweating occurs, workers will be encouraged to drink even though they may not be thirsty
- A shelter or shaded area will be provided where workers may be protected from direct sunlight during rest periods
- Monitoring of ambient or physiological heat stress indices will be conducted to allow prevention and early detection of heat induced stress. Monitoring will be conducted in accordance with applicable paragraphs of this SSHP
- Site workers will be given time to acclimatize to site work conditions, temperature, protective equipment, and workload. Acclimatization is the adaptive process that results in a decrease of the physiological response produced by the application of a constant environmental stress. On initial exposure to a hot environment, there is an impaired ability to work and evidence of physiological strain. If the exposure is repeated on several successive days, there is a gradual return of the ability to work and a decrease in physiological strain. Acclimatization usually takes two to six days of continued work in hot environments, and allows the worker's body to become adjusted to this level and type of work. This process involves a gradual increase in the workload over the required period, the length of which depends upon the nature of the work performed, the ambient temperatures, and the individual's susceptibility to heat stress. The results of acclimatization include: subjective discomfort practically disappears; body temperature and heart rate are lower; there is a more stable blood pressure; and the sweat is more profuse and dilute
- Work schedules will be adjusted as follows:
- Modify work/rest schedules according to monitoring requirements
- Mandate work slowdowns as needed
- Rotate personnel: alternate job functions to minimize over-stress or overexertion at one task
- Add additional personnel to work teams
- Perform work during cooler hours of the day if possible
- Workers will be encouraged to achieve and maintain an optimum level of physical fitness. Increased physical fitness will allow workers to better tolerate and respond to hot environments and heavy workloads. In comparison to an unfit person, a fit person will have: less physiological strain, a lower heart rate and body temperature, and a more efficient sweating mechanism

- Alcohol should not be consumed in a hot environment because the loss of body fluids increases the risk of heat stress

Heat Stress Monitoring

Heat stress prevention is important, because once a person suffers from heat stroke or heat exhaustion, that person may be more likely to have additional heat-related illnesses (Table 6-3).

The following steps to prevent heat stress should be followed:

- Provide air conditioned shelter or shaded areas to protect personnel during rest periods
- Urge workers to drink water to keep their body fluids at normal levels
- Adjust work schedules according to monitoring requirements and perform work during cooler hours of the day. The normal work schedule consists of a 10-hour day, four days per week
- Provide accurate verbal and written instructions, frequent training programs, and other information about heat stress and strain
- Permit self-limitation of exposures and encourage co-worker observation to detect signs and symptoms of heat strain in others
- Counsel and monitor those who take medications that may compromise normal cardiovascular, blood pressure, body temperature regulation, renal, or sweat gland functions; and those who abuse or are recovering from the abuse of alcohol or other intoxicants
- Encourage healthy life-styles, ideal body weight, and electrolyte balance
- Adjust expectations of those returning to work after absence from hot exposure situations and encourage consumption of salty foods (with approval of physician if on a salt-restricted diet)
- Ensure workers have current medical screening to identify those susceptible to systemic heat injury

Table 6-2
Signs and Symptoms of Heat Stress

Illness	Cause	Signs and Symptoms
Heat Rash	May result from continuous exposure to heat or humid air	Red rash on skin, intense itching and inflamation
Heat Cramps	Caused by heavy sweating with inadequate electrolyte replacement	Muscle spasms; pain in the hands, feet, and abdomen
Heat Exhaustion	Occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration	Pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting
Heat Stroke	Most serious form of heat stress; temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur; competent medical help must be obtained	Red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma

Table 6-3
Suggested Frequency for Monitoring Fit and Acclimatized Workers [a]

Adjusted Temperature [b]	Normal Work Ensemble [c]	Impermeable Ensemble
90ºF (32.2ºC) or above	After each 45 minutes of work	After each 15 minutes of work
87.5º-90ºF (30.8º- 32.2ºC)	After each 60 minutes of work	After each 30 minutes of work
82.5º-87.5ºF (28.1º- 30.8ºC)	After each 90 minutes of work	After each 60 minutes of work
77.5º-82.5ºF (25.3º-28.1ºC)	After each 120 minutes of work	After each 90 minutes of work
72.5º-77.5ºF (22.5º- 25.3ºC)	After each 150 minutes of work	After each 120 minutes of work

Reference: NIOSH/OSHA/USCG/EPA, 1985.

a. For work levels of 250 kilocalories/hour.

b. Calculate the adjusted air temperature (ta adj) by using the equation: ta adj = ta + (13 x percent sunshine), where: ta is the air temperature in ºF. Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and a sharp, distinct shadow; zero percent sunshine = no shadows.)

c. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

For temperatures above 70°F (21°C), heat stress monitoring will be initiated for workers wearing semi-permeable or impermeable clothing. The monitoring will be as follows:

Heart rate: Count the radial pulse during a 30-second period as early as possible in the rest period.

- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

6.5.3.3 Cold-related Illnesses

If work on this project is conducted in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Work will cease under unusually hazardous conditions (e.g., wind-chill less than 0°F, or wind-chill less than 10°F with precipitation). Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite. Recognition of the symptoms of cold-related illness will be discussed during the health and safety briefing conducted prior to the onset of site activities. Refer to the 2000 American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices for additional information on cold stress prevention, monitoring, and protective measures.

Hypothermia

Hypothermia is a life-threatening condition in which the core body temperature falls below 95°F. Hypothermia can occur at temperatures above freezing, particularly when the skin or clothing becomes wet. During exposure to cold, maximum shivering occurs when the core temperature falls to 95°F (Table 6-4). As hypothermia progresses, depression of the central nervous system becomes increasingly more severe. This accounts for the progressive signs and symptoms ranging from sluggishness and slurred speech to disorientation and eventually unconsciousness. The ability to sustain metabolic rate and to reduce skin blood flow is diminished by fatigue. Thus, fatigue increases the risk of severe hypothermia by decreasing metabolic heat. Additionally, because blood flow through the skin is reduced to conserve heat, the skin and underlying tissues become more susceptible to frostbite.

Table 6-4
Progressive Clinical Symptoms of Hypothermia

Core Temperature (F)	Clinical Signs
95°	Maximum shivering
87° - 89°	Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated
84° - 86°	Progressive loss of consciousness; muscular rigidity; respiratory rate decreases
79°	Victim rarely conscious
70° - 72°	Maximum risk of ventricular fibrillation

Frostbite

Frostbite is both the general and medical term given to areas of cold injury. Unlike hypothermia, frostbite rarely occurs unless environmental temperatures are less than freezing and usually less than 20°F. Frostbite injuries occur most commonly on the distal

parts of the body (nose, earlobes, hands, and feet) that are subject to intense vasoconstriction. The three general categories of frostbite are:

- Frostnip - A whitened area of the skin, which is slightly burning or painful
- Superficial frostbite - Waxy, white skin with a firm sensation but with some resiliency. Symptomatically feels “warm” to the victim with a notable cessation of pain
- Deep frostbite - Tissue damage deeper than the skin, at times, down to the bone. The skin is cold, numb, and hard

Preventing Cold-related Illnesses

Educate worker to recognize the symptoms of frostbite and hypothermia:

- Ensure the availability of an enclosed, heated environment within the vehicles. The nearest heated environment will be the interior of the vehicles at the site
- Ensure the availability of dry changes of clothes
- Record temperature readings
- Ensure the availability of warm beverages, preferably noncaffeinated

Cold Weather Monitoring and Hypothermia

Hypothermia is defined as a decrease in the body core temperature below 96°F (36°C). The following symptoms appear (in the order listed) as the body loses heat faster than it can be produced:

- Voluntary exercise to stay warm
- Involuntary exercise to stay warm (shivering)
- Loss of judgment and reasoning abilities
- Feelings of apathy, listlessness, and indifference
- Loss of control of the hands

The following steps should be taken to prevent hypothermia:

- Educate workers to recognize the symptoms of frostbite and hypothermia
- Identify and limit known risk factors
- Ensure the availability of dry changes of clothes
- Develop a capability for temperature recording at the site
- Ensure the availability of warm drinks

Monitoring the oral temperature on the job site can also be used to defend against hypothermia. This should be done at the supervisor's discretion based on changes in the worker's performance or mental status, or when the wind-chill is less than 20°F (-7°C), or a wind-chill is less than 30°F (-2°C) with precipitation. Any worker developing moderate hypothermia, defined as a core temperature of 92° (34°C), may not return to work for 48 hours.

6.5.3.4 Fire Hazards

Although fires and explosions may arise spontaneously they are more commonly the result of carelessness during the conduct of site activities, such as moving drums, mixing/bulking of site chemicals, and during refueling of heavy or handheld equipment. Some potential causes of explosion and fires include:

- Mixing of incompatible chemicals, which cause reactions that spontaneously ignite due to the production of both flammable vapors and heat
- Ignition of explosive or flammable chemical gases or vapors by external ignition sources
- Ignition of materials due to oxygen enrichment
- Agitation of shock or friction-sensitive compounds
- Sudden release of materials under pressure

Fire Prevention

Explosions and fires not only pose the obvious hazards of intense heat, open flames, smoke inhalation, and flying objects, but may also cause the release of toxic chemicals into the environment. Such releases can threaten both personnel on site and members of the general public living or working nearby. Site personnel involved with potentially flammable material or operations must follow the guidelines listed below and EM 385-1-1, Section 9, to prevent fires and explosions:

- Potentially explosive/flammable atmospheres involving gases or vapors will be monitored using a combustible gas indicator
- Prior to initiation of site activities involving explosive/flammable materials all potential ignition sources must be removed or extinguished
- Non-sparking and explosion-proof equipment must be used whenever the potential for ignition of flammable/explosive gases/vapors/liquids exists
- Dilution or induced ventilation may be used to decrease the airborne concentration of explosive/flammable atmospheres
- Smoking is restricted to designated areas on MEC work sites
- Flammable and/or combustible liquids must be handled only in approved and properly labeled metal safety cans equipped with flash arresters and self-closing lids

- Transfer of flammable liquids from one metal container to another will be done only when the containers are electrically interconnected (bonded)
- The motors of all equipment being fueled will be shut off during the fueling operations
- Metal drums used for storing flammable/combustible liquids will be equipped with self-closing safety faucets, vent bung fittings, grounding cables and drip pans, and will be stored outside buildings in an area approved by the UXOSO

Fire Protection

The following safe work practices are to be used to protect against fires:

- Vehicles and equipment will not be fueled while running
- Flammable/combustible liquid storage areas have at least one 4A:20:B:C fire extinguisher located within 25-75 feet and marked with the appropriate fire symbol and no smoking signs
- All vehicles used in the transport of explosives are equipped with two fire extinguishers of not less than 2A:10B:C or higher, with one fire extinguisher mounted/placed inside the cab of the vehicle and one mounted outside, by the driver's side door, if possible
- Temporary offices will be equipped with a fire extinguisher of not less than 10:ABC
- At least one portable fire extinguisher having a rating of not less than 4A:20B:C will be located at each work site

6.5.3.5 Ionization Radiation

No radiological hazards are anticipated during operations at the former Fort Ord. If any radioactive sources are encountered by the LFR Team personnel or their subcontractors work at that location will be stopped and the PHSM will be contacted to provide guidance on proper protective measures.

6.5.4 Chemical Hazards

Non-CWM chemical hazards, such as lead-contaminated soils or lead-based paint, may be anticipated at former small arms ranges or during demolition of existing structures. Should contaminated soils be encountered, the PHSM will be contacted to provide guidance on appropriate safety precautions.

Chemical Warfare Munitions

Chemical Munitions, Chemical Warfare Material, or Radiological Contamination is not anticipated to be encountered during operations on the former Fort Ord; however, should personnel encounter a suspected toxic chemical munitions, Chemical Warfare Material, or any situation where radiological contamination could become a concern, all personnel will immediately withdraw upwind to a safe location outside of the fragmentation zone of the type ordnance located and contact the UXOSO who will notify the appropriate agencies.

The site will be secure with two UXO Technicians (minimum of one UXO Technician II and one UXO Technician I) until the arrival of the Technical Escort Unit (TEU) or Military EOD. The LFR Team will assist the TEU as directed. Decontamination station setup and operation will be performed by fire department hazardous response personnel.

Ordnance Fillers

In the event of locating a Livens Projector, 4-inch Stokes, or a 4.2-inch mortar and positive identification of the filler remains unknown, the item will be left in place awaiting disposition by TEU who will identify the filler prior to final disposition.

6.5.5 Hazard Analysis

The LFR Team has analyzed the scope of work tasking to determine the work risk hazards associated with each task. The tasks consist of direct tasks and implied tasks, or sub tasks, to accomplish the work. Table 6-7 presents each activity, the associated hazards, and the control measures planned to prevent accidents.

6.6 Medical Monitoring

Personnel engaged in field activities must be enrolled in a medical surveillance program as required by 29 CFR Part 1910.120(f). Doctors on Duty, 2260 North Fremont Street, (831) 372-6700, is used to provide the medical examinations for WESTON personnel. Qualisys Medical Network Services, 4501 Circle 75 Parkway, Suite C-3250, Atlanta, Georgia, (770) 226-9944, provides medical surveillance and records management. The content of the examination must be designed to determine each individual's fitness for duty, including ability to work while wearing protective equipment (e.g., respirator, impermeable clothing, etc.).

Personnel performing on-site field activities on this project must present to the UXOSO a physician's certification of completion of a comprehensive medical monitoring examination within the 12 months prior to the beginning of field activities. Additionally, the UXOSO will ensure that workers remain current in their medical monitoring throughout the duration of the project.

6.7 Training

All personnel performing field activities at former Fort Ord sites must have received 40 hours of initial hazardous waste operations and emergency response (HAZWOPER) health and safety training (or have equivalent training) in accordance with the provisions of 29 CFR 1910.120(e)(3) and must be current in their refresher training. Site supervisors responsible for personnel engaged in field activities must have attended a site management training as required by OSHA in 29 CFR 1910.120(e)(4). At least one member of each field team must be current in first aid and CPR training. Copies of training certificates will be provided to the UXOSO.

6.7.1 Site-Specific Training

In addition to the 40-hour initial training and 8-hour refresher training, site-specific training will be conducted. The UXOSO is responsible for developing a site-specific occupational hazard training that will be provided to all LFR Team personnel and subcontractors prior to the start of field operations, as required. This training will cover the following topics:

- Names of personnel responsible for site safety and health
- Safe work practices
- Site history
- Safety, health, and other hazards at site
- Work zones and other locations
- Emergency procedures, evacuation routes, emergency phone numbers
- Personal protective equipment for anticipated task
- Safe use of engineering controls and equipment on the site
- Blood borne pathogens
- Ordnance recognition and reporting
- Prohibitions in areas and zones, including:
- Site layout
- Procedures for entry and exit of work areas and zones

In addition, site specific training may include Lead Awareness Training.

6.7.2 Tailgate Safety Meetings

The SUXOS will conduct tailgate safety briefings for field personnel. This training must as a minimum cover the following topics:

- Tasks to be performed
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, or danger signals
- Emergency procedures (emergency equipment, emergency communications, and route to hospital)
- Rallying Points and safe refuge areas

6.7.3 Supervisor Meetings

Weekly meetings will be held for all supervisors. The agenda will include the past week's operations, safety issues/problems, corrective actions required or taken, and the upcoming week's activities.

6.7.4 Training Documentation

The UXOSO will maintain copies of training certificates (HAZWOPER, EOD School Certificate, and CPR/first aid) for personnel participating in field operations. The UXOSO will document site-specific initial training, lead awareness training, tailgate training/subjects, and any other special or additional training.

6.7.5 Hazard Communication Training

All project work will be conducted in accordance with standard policies for hazard communication. Copies of MSDSs for any hazardous chemicals brought on site will be maintained at the field office. Employees that are exposed to hazardous chemicals brought to the site must receive training on:

- The physical and health hazards of the chemicals in the work area
- Methods and observations that may be used to detect the presence or release of the hazardous chemicals in the work area
- The measures a worker can take to protect themselves from these hazards

6.7.6 Blood Borne Pathogens Training

Personnel working on this project will be provided blood borne pathogen training review. This training will be given initially at the same time as the site-specific training. The topics covered in the training will include the following:

- An overview of the Blood Borne Pathogen Standard
- Epidemiology and symptoms of blood borne diseases
- Modes of transmission of blood borne pathogens

- Discussion of Exposure Control
- Tasks that may involve exposure to blood and other potentially infectious materials
- Review of the methods that will prevent or reduce exposure
- Selection and use of PPE
- Information on the post-exposure evaluation and follow-up program

6.7.7 Visitor Training

All visitors to the site will be given a health and safety briefing prior to gaining access to the site. Following this briefing, visitors will be asked to sign SSHP - Plan Acceptance Forms. The UXOSO will also ensure that visitors have applicable health and safety equipment, medical surveillance, and training for the activities/areas they will be visiting. Should questions arise as to whether or not specific training or equipment is needed - the PHSM will be contacted.

6.7.8 Ergonomic Training

An Industrial Training Program will be implemented and documented in accordance with OSHA and California Code of Regulations.

6.8 Personal Protection Equipment

Personal protective equipment required at the site will be at a level necessary to protect personnel. No contamination is anticipated; therefore, a level D ensemble will be worn.

6.8.1 Level D Protection Ensemble

The minimum level of protection for all personnel at this site is level D. A level D ensemble consists of:

- Short- or long-sleeve coveralls or work clothing
- Kevlar chaps (when operating chainsaw)
- Leather work boots (steel toe if a foot hazard exists [brush clearing and excavation])
- Safety glasses or goggles when an eye hazard exists (brush clearing and hand or mechanical excavation operations)
- Hard hat, when a head hazard exists (brush clearing and around heavy equipment)
- Work gloves, leather or rubber as appropriate
- Hearing protection when working around heavy equipment or powered hand tools

- Respirator when clearing/grubbing rodent nests (APR with N-100 cartridge)
- Sun block and insect repellant as needed
- Demolition operations PPE
- Reflective safety vest usage

6.8.2 Upgrading PPE

The level of protection is based on what is known about the site. Protection levels may change as site conditions change. The UXOSO monitors site conditions and provides information to the PHSM and RPM as necessary. The UXOSO may increase the levels of protection when necessary but cannot downgrade them without approval from PHSM. PPE requirements specific to lead hazards are provided by the Lead Management Plan.

6.9 Site Control

The UXOSO will coordinate access control and security on site. Due to the hazardous nature of MEC, only authorized personnel will be allowed in the exclusion zone (EZ). The EZ is the work site, encompassing an area large enough to prevent personnel injuries as a result of MEC operations. The boundary of the EZ will be appropriately identified. During intrusive operations the boundary will be established by the UXOSO based on minimum separation distance. The MSD is the minimum separation distance for unrelated personnel given unintentional detonation of conventional ordnance items. The MSD for all unrelated personnel for an unintentional detonation will be determined by the greatest distance 200 feet, the K50 distance, or the maximum fragment throw distance. During intrusive operations only essential trained personnel are allowed in the EZ.

Visitors must check-in at the field office to gain access to work sites. The UXOSO or a designee will escort visitors to and from work sites. During all operations on site the field supervisors can cease operations if unescorted personnel are observed within the operating area. During work hours LFR Team personnel provide security at the site. Equipment is secured at the end of the workday.

Representatives from regulatory agencies are permitted to enter the site at any time during business hours or any other reasonable time with an escort. Regulatory agencies will be allowed to perform their oversight functions during MEC operations, and are considered essential personnel. Site controls to ensure their safety are included in Section 6.4, Activity 5: MEC Operations.

In the case of an emergency, personnel will exit the site and move to the designated safe area. The safe area will be located upwind of the site. The UXOSO will determine the severity of the emergency. If the emergency warrants site evacuation the UXOSO or SUXOS will notify the Presidio of Monterey (POM) Fire Department and the proper

authorities. After property transfer, the UXOSO or SUXOS will notify the Seaside Fire Department, who will assume emergency response responsibility.

6.10 Decontamination and Personnel Hygiene

In general, no hazardous, toxic, or radiological waste materials are anticipated; thus decontamination for constituents will not be required. Site sanitation will be established and maintained in compliance with 29 CFR 1926.51 and EM 385-1-1, Section 2.

6.10.1 Potable Water

An adequate supply of drinkable water will be provided on site during work activities.

6.10.2 Toilet Facilities

As the former Fort Ord work sites are not provided with a sanitary sewer system, temporary toilet facilities will be used (Table 6-5). Each temporary toilet will be naturally lighted, ventilated, and lockable from the inside.

6.10.3 Washing Facilities

Washing facilities in the EZ will consist of water containers, buckets, soap, and drying towels. Workers exiting the EZ must wash hands and face prior to eating, drinking, or smoking.

Table 6-5
Minimum Number of Facilities

Number of Employees	Number of Facilities
20 or fewer employees	One toilet with seat
More than 20, less than 200 employees	One toilet with seat and one urinal per forty employees
More than 200 employees	One toilet with seat and one urinal per fifty employees

6.11 Environmental and Personal Monitoring

Exposure to hazardous airborne substances is anticipated only in areas where lead hazards may exist (i.e., small arms ranges, or during structure demolition). Exposure assessment monitoring requirements are provided by the Lead Management Plan.

6.12 Emergency Response and Contingency Procedures

The frequency and severity of emergency situations can be dramatically reduced through proper implementation of the SSHP. However, if an emergency does occur, quick, decisive action will be required since delays in minutes can create or escalate life-threatening situations. In an emergency situation, site personnel involved in emergency response and rescue must be prepared to respond immediately and all required equipment must be on hand, in proper working order, and ready to use. To ensure rapid, effective response to a site emergency, the procedures and contingency plans outlined in this section will be implemented prior to and during the conduct of any site activities involving exposure to safety and health hazards.

6.12.1 Identifying Potential Emergencies

Contingency plans for responding to the potential emergency situations have been developed and are presented below. Potential emergencies that may occur include:

- Injury or illness
- Fire/explosion
- Inclement weather

6.12.2 Emergency Response Responsibilities

In the event of an emergency, the UXOSO will assume the responsibility of being the On Scene Incident Commander (OSIC). The alternate person to assume this role, in the event that the UXOSO is unavailable or incapacitated, will be the SUXOS. The OSIC will have the responsibility of directing all on-site and off-site response personnel. Upon arrival of First Responders (i.e., fire department) and upon determination that no ordnance or explosives hazard exists, the role of OSIC will be turned over to the senior responding member of the fire department.

6.12.3 On-Site Emergency Response Services

WESTON personnel will provide first aid treatment for minor injuries up to the limits of their qualifications and training. At least one person per team will be First Aid and CPR certified. If necessary the OSIC will contact medical personnel to determine if additional

treatment is required. If further treatment is required the fire department providing fire services to Fort Ord will be notified and the injured person will be transported to the Community Hospital of the Monterey Peninsula (CHOMP). If transport by the WestMed ambulance is required, an escort will meet the ambulance at the corner of General Jim Moore Boulevard and Eucalyptus Road and guide them to the accident site.

6.12.4 Off-Site Emergency Response Services

Off-site emergency response services may include local fire and law enforcement personnel. Emergency phone numbers for off-site response organizations are presented in Table 6-6.

6.12.5 Route to Hospital

The evacuation route map to the CHOMP from Fort Ord is presented below (Figure 6-4). The map will be kept in all vehicles. Directions for evacuation are printed with the map below.

Directions to: Community Hospital of Monterey Peninsula
23625 Holman Highway, Monterey, California 93940
(831) 624-5311

1. Access CA- 1 from Seaside or Sand City.

2. CA-1 S becomes CA-1 S/CA-68 W. Take the 68 West exit toward Asilomar.

3. The hospital will be on the right.

Figure 6-4
Route to Hospital

Table 6-6
Emergency Contacts

Emergency Contact	Telephone Number
MEDEVAC, Cal Star	(800) 252-5050
Community Hospital of the Monterey Peninsula	(831) 624-5311
Santa Clara Valley Medical Center	(408) 885-5000
WestMed	(831) 655-4040
POM Fire Department	(831) 242-7851/7852
POM Police	(831) 242-7853
Seaside Fire Department	(831) 899-6790
Seaside Police	(831) 899-6753
WESTON PHSM – Mike Stuart	(505) 837-6566
WESTON Remediation Project Manager-Linda Temple	(831) 384-3221
Poison Control	(800) 222-1222

6.12.6 Emergency Response Training

All site personnel will receive specialized training that will be given by the UXOSO prior to initiating site activities involving safety and health hazards. The content of this training will include the items listed below and will be documented using the site Training Log.

- Emergency chain-of-command
- Communication methods and signals
- Emergency equipment and PPE
- Removing injured personnel from the site
- Emergency contacts, phone numbers and hospital route

6.12.7 Emergency Equipment

During intrusive operations, the UXOSO will maintain emergency equipment containing the following: an eyewash station, first-aid kit, a fire extinguisher, a portable cellular telephone and radio. Copies of pertinent figures including emergency phone numbers and maps to emergency facilities will be included with this equipment.

For non-intrusive operations, such as geophysical surveying, a first-aid kit, fire extinguisher, and radio will be provided.

6.12.7.1 Fire Extinguishers

Portable fire extinguishers approved by a nationally recognized testing laboratory, and labeled to identify the labeling organization and the fire test and performance standard, will be provided at each individual job site. Extinguishers will be fully charged and in operable condition.

A dry-chemical type 4A:20B:C extinguisher will be available at each work site. Each piece of heavy equipment, site trailer, and each vehicle will be equipped with at least a 2A:10B:C fire extinguisher.

6.12.7.2 First Aid Equipment

First aid kits will be the 16 unit first aid kits and comply with American National Standards Institute (ANSI) Z308.1. A kit will be located in each field team vehicle and at the field office. Kits will be inspected on a weekly basis and missing components replaced immediately.

6.12.8 Communication Devices

Site communication devices will include portable, hand-held two-way radios for communication between teams and the field office. Cellular telephones will be used to communicate with off-site individuals and organizations. Radios will be distributed to the SUXOS the UXOSO and to each field team supervisor.

6.12.9 General Emergency Procedures

Emergency response procedures include all steps to be taken for notifying, evaluating, reacting to, documenting, and following-up on a given emergency situation. To ensure all necessary elements are covered, the procedural steps outlined in this paragraph will be implemented for each emergency, regardless of its nature.

6.12.9.1 Notification

Once the OSIC has been informed of an emergency, the OSIC will alert site personnel to the presence of the emergency by radio. This will be done to:

- Notify personnel and to get their attention
- Stop all work activity as required

- Lower noise levels in order to speed and simplify communication
- Initiate emergency or evacuation procedures

If on-site LFR Team personnel or off-site emergency personnel are to enter the site in response to the emergency, the OSIC will to the extent possible, notify the response personnel about the nature of the emergency, to include:

- What happened and when it happened
- Where on site the emergency situation occurred
- Who is involved and, if possible, the cause of the emergency
- The extent of damage and what hazards may be involved
- What actions should be taken

6.12.9.2 Assessing the Emergency

Available information related to the emergency and the on-site response capabilities should be evaluated and the information listed below obtained to the extent possible:

- What happened:
- Type of incident
- Casualties involved:
- Victims (number, location and condition)
- Treatment required
- Missing personnel
- Cause of incident
- Extent of damage to structures, equipment and terrain
- What could happen from this point:
- Potential for fire or explosion
- Location of all personnel in relation to hazardous areas
- Potential for emergency affecting the general public or the environment
- What can be done to remedy the situation:
- Equipment and personnel needed for rescue and hazard mitigation
- Number of uninjured personnel available for response
- Resources available on site
- Resources available from off-site response groups and agencies
- Time needed for off-site response resources to reach the site

- Hazards involved in rescue and response

6.12.9.3 Rescue and Response Actions

Based on the information collected during the emergency assessment, the general actions listed below will be taken, with some actions being conducted concurrently. No one will attempt emergency response/rescue until the situation has been assessed and the appropriate response outlined by the OSIC.

- Enforce the Buddy System:
- Allow no one to enter a hazardous area without a partner
- Personnel in the EZ should be in line-of-sight or in communication with the OSIC or his designee
- Survey Casualties:
- Locate all victims and assess their condition
- Determine resources needed for stabilization and transport
- Assess Existing and Potential Hazards and Determine:
- Whether and how to respond
- The need for evacuation of site personnel and off-site population
- The resources needed for evacuation and response
- Contact the required off-site/on-site personnel or facilities, such as ambulance, fire department, police, etc.
- Allocate on-site personnel and equipment to rescue and initiate incident response operations
- Assist in bringing the hazardous situation under complete or temporary control and use measures to prevent the spread of the emergency, i.e., control fire, secure site, etc.
- Remove or assist victims from the area
- Stabilize:
- Administer any medical procedures that are necessary before the victims can be moved
- Stabilize or permanently fix the hazardous condition
- Attend to what caused the emergency and anything damaged or endangered by the emergency (e.g., drums, tanks)
- Transport using either on-site or off-site assets
- Casualty Logging-Record who, time, destination and condition upon transport
- Evacuate:

- Move site personnel to the rally point, a safe distance upwind of the incident
- Monitor the incident for significant changes; the hazards may diminish, permitting personnel to re-enter the site, or hazards may increase and require public evacuation
- Casualty Tracking-Record disposition, condition and location

6.12.9.4 Post Emergency Follow Up

Before normal site activities can resume, the site and personnel must be prepared and equipped to handle another emergency. It is also imperative that all federal, state, and local regulatory agencies be notified of the emergency. Therefore, the following activities must be conducted prior to resumption of site activities:

- Notify all appropriate governmental agencies as required (i.e., OSHA must be notified if there have been any fatalities or three or more personnel hospitalized)
- Restock and clean all equipment and supplies utilized or damaged in the emergency
- UXOSO should conduct an accident investigation to determine the cause of the emergency and what preventative measures could be taken to ensure the emergency does not occur again
- Review and revise, as needed the SSHP to reflect the new procedures

6.12.10 Contingency Plans

The following paragraphs contain emergency specific contingency plans. These plans outline the procedures for mitigating potential emergency situations. Any changes to these plans must be approved by the PHSM.

6.12.10.1 Injury or Illness

In the event of an emergency involving personal injury or illness, immediate response will be key in preventing further harm and providing comfort to the affected party. When personnel are injured or overcome by illness, the following procedure will be followed:

- Upon notification of the occurrence and nature of the injury/illness the OSIC will, if deemed necessary, summon emergency personnel
- The OSIC or SUXOS will assess the severity of the injury/illness and direct personnel to provide CPR/First aid as needed
- If immediate life support is not required, or once the victim is stabilized, and if required, transport victim to the appropriate medical facility for further attention

6.12.10.2 Fire and Explosion

Small Fire

A small fire is defined as a fire that can be extinguished with a 4A:20B:C type fire extinguisher. In the event of a small fire, site personnel will take the following actions:

- All unnecessary personnel will be evacuated from the immediate area, to an upwind location
- Extinguish the fire using portable fire extinguishers or by smothering from an upwind location
- Request emergency response assistance (ambulance, fire, police) as needed
- Do not attempt to extinguish a fire, even a small one, involving explosives
- Notify the UXOSO, SUXOS and the RPM

Large Fires

In the event of a large fire (or small fire which cannot be extinguished), the following actions will be taken:

- All unnecessary personnel will be evacuated from the site, to an upwind location
- The Local Fire Department, and/or other emergency response services (police, ambulance, hospital, etc.) will be notified as needed by the OSIC
- OSIC will meet Fire Department and direct them to location of fire
- After the Fire Department has arrived, OSIC will notify the Project Manager (PM) and RPM

Explosion

In the event of an explosion, all nonessential personnel will evacuate and help secure the site; the OSIC will request the required support equipment and personnel. It is essential that the site be evacuated and no one is allowed to re-enter, except to possibly save a life, until at least 30 minutes or longer if necessary, after the explosion. The OSIC will determine what actions are appropriate.

6.12.10.3 Chemical Spills

A spill kit will be maintained at the site in case a chemical being used at the site (such as oil or gasoline) is spilled. The kit will include spill absorbers (spill socks, pads, and pillows), and disposable bags. Approximately 18 gallons of spilled oil, coolants, fuels, or water can be absorbed using the contents of the kit.

All spills will be immediately reported to UXOSO per procedures outlined in the Environmental Protection Plan.

6.13 Logs, Reports, and Record Keeping

6.13.1 Logbook

The SUXOS will keep a log recording the following aspects related to safety at the site:

- Training (initial site specific training, tailgate meetings, etc)
- Site visitors
- Safety issues or problems encountered
- Accidents
- Emergencies

6.13.2 Safety Logs

The UXOSO will maintain a daily safety log of all safety related activities. The following information will be maintained in the safety log:

- Date and recorder of log
- Tailgate safety briefing (time conducted, material discussed, etc.)
- Weather conditions
- Significant site events relating to safety
- Accidents
- Stop-work events related to safety
- Safety inspections

6.13.3 Training Logs

The UXOSO will maintain a training log documenting the following information:

- Date of training
- Type of training (initial, tailgate briefing, visitor)
- Workers or visitors attending training
- Signature of UXOSO

6.13.4 Equipment Maintenance

The SUXOS will document the results of daily check of heavy equipment using the Heavy Equipment Daily Inspection List.

6.13.5 Record Keeping

The UXOSO will establish and maintain a filing system on site for health and safety records, reports, and information concerning individual training, medical surveillance, etc. Sections in this filing system will include:

- Training Records - Certificates for training required by 29 CFR1910.120 (40-hour initial HAZWOPER, 8 hour refresher, and supervisory training) will be maintained at the site. Additionally, documentation of CPR and First Aid training will be available at the site
- Medical Monitoring - Documentation of current enrollment (within last 12 months) in a medical monitoring program will be available for each employee working at the site. Documentation will consist of the employee's Health Status Report that is written and signed by the examining physician
- Accident Reports - Copies of any accident/incident reports and follow-up reports
- Plan Acceptance Forms - Copies of the Plan Acceptance Forms documenting that employees have read and understand the SSHP will be maintained at the site

6.13.6 Accident Reporting

If an injury occurs on site, the UXOSO is responsible for completing a WESTON accident report form. The UXOSO must submit a copy of this form to PHSM within 24 hours of the injury. All accidents/incidents must be investigated by the UXOSO. The purpose of the investigation is to determine the causal factors that lead to the accident/incident and to establish corrective actions to prevent recurrence.

6.14 Standard Operating Procedures, Engineering Controls, and Safe Work Practices

6.14.1 General Safety

- The following are standard practices for work on Fort Ord sites
- Eating, drinking, chewing tobacco, smoking, and carrying matches or lighters are prohibited in a contaminated or potentially contaminated area or where the possibility of contamination transfer exists

- Field crewmembers should be alert to all potentially dangerous situations i.e., presence of strong, irritating, unusual or nauseating odors
- Field crewmembers will be familiar with the physical characteristics of a site during intrusive investigations, including:
- Wind direction in relation to nearby buildings
- Accessibility to associates, equipment, vehicles, communication
- Hot zone (areas of known or suspected contamination)
- Site access
- Nearest water sources
- Protective equipment as specified in this SSHP will be used by workers throughout the Fort Ord project
- Use of heavy equipment on site, i.e., trucks, and bobcats, presents additional hazards for site workers. For example, the vision of a backhoe operator is limited, so all field crewmembers should stay clear when backhoe is operating
- Wearing personal protective equipment can result in an impairment of the ability to operate site equipment. All field crewmembers should pay specific attention to decreased performance capabilities resulting from the use of personal protective equipment, such as poor tactile skills when wearing certain types of gloves. Prior knowledge of limitations imposed by the use of such equipment and clothing will allow the worker to assess the decrease in his or her capability to perform field operations in a safe manner
- Wearing of jewelry, such as loose bracelets and necklaces is prohibited in order to avoid its entanglement in site machinery

6.15 Procedures and Programs

6.15.1 Hearing Conservation Program

The purpose of this Hearing Conservation Program is to provide protection for employees from adverse health effects associated with occupational exposure to noise. The program consists of annual audiometric testing of workers, annual employee training, selection, and use of hearing protection, and noise monitoring. All employees and subcontractors must comply with this program.

Audiometric Testing Program

Audiometric testing will be made available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels. Audiometric tests will be performed by a licensed or certified audiologist, otolaryngologist, or physician who is certified by the Council of Accreditation in Occupational Hearing Conservation. Each

employee assigned to noisy operations must receive a baseline audiogram prior to assignment and yearly testing thereafter for as long as that employee is exposed to excessive noise levels (8-hour time- weighted average of 85 decibels or greater). Each employee's annual audiogram is compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. (A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.) This comparison should be done by a physician.

If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift has occurred, the employee will be informed of this fact in writing, within 21 days of the determination. The following steps are taken by the UXOSO when a standard threshold shift occurs:

- Employees not using hearing protectors will be fitted with hearing protectors, trained in their use and care, and required to use them
- Employees already using hearing protectors will be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary
- The employee will be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary
- The employee is informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected

Audiometric tests will be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. tests at each frequency will be taken separately for each ear. Audiometric tests will be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969. The functional operation of the audiometer will be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Audiometer calibration will be checked acoustically at least annually in accordance with OSHA requirement (29 CFR 1910.95, Appendix E).

Hearing Protectors

The UXOSO will make hearing protectors available to all LFR Team and subcontract employees exposed to an 8-hour time-weighted average of 85 decibels or greater. Hearing protection for this project will consist of earmuffs or foam fitting earplugs. The selection of hearing protector will be based upon noise attenuation requirements for the task and worker comfort.

Employee Training

The UXOSO will develop a hearing conservation training program for all employees assigned to noisy work. This training will be a component of the initial site safety training. As a minimum the training will consist of:

- The effects of noise on hearing
- The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care
- The purpose of audiometric testing, and an explanation of the test procedures

Noise Monitoring

When operations are anticipated to exceed the 8-hour time-weighted average of 85 decibels, the UXOSO will implement a noise monitoring program. The sampling will be used to:

- Verify that appropriate hearing protection is being used by employees
- Identify the boundaries of the noise hazard area in accordance with Section 05.C.07 of EM 385-1-1
- Instruments used to measure employee noise exposure will be calibrated to ensure accuracy

6.15.2 Hazard Communication Program

Introduction

The OSHA Hazard Communications Standard (29 CFR 1910.1200) was promulgated to ensure that all chemicals would be evaluated and information regarding the associated chemical hazards would be communicated appropriately. The goal of the standard is to reduce the number of chemically related occupational illnesses and injuries.

In order to comply with the OSHA Hazard Communication Standard, this written program has been established for work at Fort Ord. All LFR Team and subcontractor personnel working at Fort Ord are included in this program.

Hazardous Chemical Inventory List

Hazardous chemicals used at Fort Ord include industrial chemicals such as fuels, oils, and greases. The UXOSO will maintain an inventory of hazardous chemicals brought onto Fort Ord.

Material Safety Data Sheets (MSDSs)

MSDSs are prepared by manufacturers or producers to provide specific information on the safety precautions and health effects of a particular chemical or mixture. The MSDS contains at a minimum the following information:

- Chemical and common names
- Physical and chemical characteristics
- Physical hazards
- Health hazards
- Primary routes of entry
- Exposure limits
- Carcinogenic potential
- Handling and protective precautions
- Control measures
- Emergency and first aid procedures
- Date of MSDS preparation
- Name and address of manufacturer

When chemicals are ordered, the SUXOS or his designee will specify on the purchase order that chemicals are not to be shipped without corresponding MSDSs. When chemicals and MSDSs arrive, they will be reviewed for completeness by the UXOSO or his designee. Should any MSDS be incomplete, a letter or FAX will be sent immediately to the manufacturer requesting the additional information, LFR Team or its subcontractors will not accept (at Fort Ord sites) any shipped chemical materials without an MSDS.

A complete file of MSDSs for all hazardous chemicals to which an employee of the LFR Team may be exposed will be kept in labeled files on site. MSDSs for chemicals anticipated to be used at the site are provided at the end of this attachment. In the event that an MSDS is missing the employee should immediately contact the UXOSO or PHSM.

MSDSs at this site will be reviewed during periodic audits by the PHSM. Should there be any MSDS that has not been updated within the past year a new MSDS will be requested.

Labels and Other Forms of Warning

The Hazard Communication Standard requires that hazardous chemicals be labeled by manufacturers. The label must contain the following:

- Chemical identity

- Appropriate warnings
- Name and address of manufacturer, importer, or other responsible party. If the labels are incomplete or missing, LFR Team personnel will refuse the shipment.

When chemicals are transferred from the manufacturer's containers to secondary containers, the Site Manager or UXOSO will ensure that the containers are labeled with the identity of the chemicals and appropriate hazard warnings. Labels for secondary containers can be obtained from the UXOSO.

The entire labeling procedure will be reviewed at least annually and changed as necessary.

Employee Information and Training

Prior to starting work the LFR Team and its subcontractors' employees will attend a site specific safety and health training course. This course will include Hazard Communication Training to review the contents of this program and learn the hazards associated with each listed hazardous chemical. The training will be performed by the UXOSO. The format will be classroom training.

Training Topics

The site training or HAZCOM will include:

- An overview of the requirements of the Hazard Communication Standard
- The labeling system and how to use it
- How to review MSDSs and where they are kept
- Chemicals present in work operations
- Physical and health effects of hazardous chemicals
- Methods and observation techniques used to determine the presence or release of hazardous chemicals in the area
- PPE and work practices to reduce or prevent exposure to chemicals
- Steps to be taken to prevent or reduce exposure to chemicals
- Safety-emergency procedures to follow if exposure occurs
- Location and availability of written program/MSDSs
- Equipment Training (Table 6-8)

Following the training session(s), each employee will sign and date the training record. Additional training may be provided by the UXOSO, with the introduction of each new hazardous chemical. Records of additional training will be maintained.

On-Site Contractors and Visitors

WESTON understands that at times other persons may be on the work site. New contractors, subcontractors and visitors will be required to attend site health and safety training to familiarize them with the contents of this document and the specific hazards associated with the former Fort Ord. New contractors, subcontractors, and visitors will be provided with the following information:

- Hazardous chemicals to which the contractor's employees or visitors may be exposed
- Precautions necessary to protect employees during normal operating conditions and foreseeable emergencies
- Labeling system used in the work place

It is the responsibility of the Site Manager and/or UXOSO to ensure that all MSDSs of chemicals to which the contractor's employees or visitors may be exposed are made available at a central location in the work place along with an example of the labeling system in use. Visitors and subcontractors will be informed of the availability of this information and its location.

Program Review

This written hazard communications program for the LFR Team will be reviewed by the PHSM at least annually and updated as necessary.

Table 6-7: Hazard Analysis by Site Activity
Activity 1—Preliminary Activities

Activity	Hazards	Hazard Control
Mobilization of personnel, equipment, and supplies to the project site, setup of office and storage areas.	***Chemical Hazards***— Non-intrusive activities; therefore, the risk level of exposure to site contaminants during this activity is low. Focus on hazard awareness and change of conditions.	No intrusive measures allowed during this activity. Wear appropriate PPE for skin protection and to prevent dermal contact. Avoid liquid pools and stained areas if possible. An initial visual survey will be conducted to confirm the levels of protection are correct for the activity.
	Physical Hazards— Slips, trips, falls, tools, terrain, or vegetation; uneven walking surfaces; weather hazards, such as snow and ice; and poor visibility.	The work area will be visually inspected. Housekeeping - Slip, trip, and fall hazards will be either removed or marked and barricaded. Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized; and ice, snow, and mud will be cleared from steps to reduce slip hazards. Work to be completed in adequate natural light or assure sufficient illumination is maintained. Site personnel will conduct an initial walkover, and the "buddy system" will be implemented. Fall protection (railing or Fall Arrest Systems) will be installed if work is to be conducted at a level higher than 6 feet. See field operating procedure (FLD) 02, FLD 11, FLD 12, and FLD 39.
	Manual lifting	Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.

Table 6-7: Hazard Analysis by Site Activity
Activity 1—Preliminary Activities

Activity	Hazards	Hazard Control
	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 feet of the fuel storage area, in construction equipment, and strategically in the construction area. See FLD 31 and 32.
	Hands or fingers caught between objects; abrasions and lacerations.	Personnel will be made aware of the hazard and asked to coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects.
	Electric hazards	Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 feet from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35, and 38.
	Moving/heavy equipment operations.	Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel will be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.

Table 6-7: Hazard Analysis by Site Activity
Activity 1—Preliminary Activities

Activity	Hazards	Hazard Control
	Hand tools, manual and power.	Tools will be inspected prior to use. Damaged tools will be tagged out of service until repair can be performed by a qualified person. Use tools properly and for their intended purpose. All power circuits used for hand tools will be protected by a ground fault circuit interrupter. All personnel will be trained on the proper use of all power tools. Lockout/ tagout procedures will be implemented per FLD 42 and 29 Occupational Safety and Health Administration (OSHA) 1910. Also see FLD 38.
	Caught in/between/struck by or against an object.	Workers will stay out of the swing area of all equipment and will not walk, work or stand near equipment being loaded or unloaded. No personnel will ride on the equipment unless seats are provided. See FLDs 20, 23, and 24. Ground personnel near operating heavy equipment will wear hard hats and traffic vests. The handling and placement of heavy equipment will be carefully coordinated. Materials and objects will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. Backup alarms will be in operable condition. Unnecessary backing will be avoided. Safety toe footwear will be required. Tools will be properly used.
	Inclement weather, heat/cold stress	Workers will be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to American Conference of Governmental Industrial Hygienists (ACGIH), National Institute for Occupational Safety and Health (NIOSH) guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the UXOSO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.

Table 6-7: Hazard Analysis by Site Activity
Activity 1—Preliminary Activities

Activity	Hazards	Hazard Control
	Traffic	Work areas will be clearly barricaded using existing gates and appropriate signs displayed. Traffic will be rerouted as necessary. Persons working in traffic area, near roadways or directing traffic will wear high visibility (reflective) vests. Posted speed limit of 15 mph. See FLD 20.
	Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.	Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan— First Aid Procedures FLD 43.
	Radiation—Potential sun burn/sun poisoning hazard on bright, sunny days.	Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.

Table 6-7: Hazard Analysis by Site Activity
Activity 2—Site Preparation Activities

Activity	Hazards	Hazard Control
Site surveying to delineate work areas.	***Chemical Hazards***—The potential for exposure to petroleum and diesel products exist for this task.	Vehicles will not be over-filled, and caution will be used whenever refueling. Refueling will not be conducted within 100 feet of an open flame.
	Physical Hazards—Slip, trips, falls; tools, terrain or vegetation, uneven walking surfaces; weather hazards; poor visibility.	The work area will be visually inspected. Housekeeping - Slip, trip, and fall hazards will be either removed or marked and barricaded. Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized and ice, snow, and mud will be cleared from steps to reduce slip hazards. Work to be completed in adequate natural light or assure sufficient illumination is maintained. Site personnel will conduct an initial walkover, and the "buddy system" will be implemented. Fall protection (railing or Fall Arrest Systems) will be installed if work is to be conducted at a level higher than 6 feet. See FLD 02, FLD 11, FLD 12, FLD 39.
	Manual lifting	Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.
	Inclement weather, heat/cold stress	Personnel will be dressed according to weather conditions. Workers will be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the UXOSO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.

Table 6-7: Hazard Analysis by Site Activity
Activity 2—Site Preparation Activities

Activity	Hazards	Hazard Control
	Moving/heavy equipment operations	Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel will be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.
	Hands or fingers caught between objects; abrasions and lacerations.	Personnel will be made aware of potential hazards and will coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for ice and rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. See FLD 10.
	Noise exposure	High noise areas will be identified. Hearing protection will be provided as appropriate. The latest ACGIH threshold limit values (TLVs) will be used. Personnel operating chainsaws will use hearing protection. Hearing control program, which consists of audiometric examination; training; use of hearing protection; and sound level pressure monitoring when and where necessary. See FLD 01.
	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 feet of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.

Table 6-7: Hazard Analysis by Site Activity
Activity 2—Site Preparation Activities

Activity	Hazards	Hazard Control
	Electric hazards	Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 feet from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35 and 38.
	Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.	Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.
	Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.	Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.

Table 6-7: Hazard Analysis by Site Activity

Activity 3—Excavation Activities

Activity	Hazards	Hazard Control
Excavation Activities.	***Chemical Hazards***—The potential for exposure to petroleum and diesel products exist for this task.	Vehicles will not be over-filled, and caution will be used whenever refueling. Refueling will not be conducted within 100 feet of an open flame.
	Physical Hazards—Slip, trips, falls; tools, terrain or vegetation, uneven walking surfaces; weather hazards; poor visibility.	The work area will be visually inspected. Housekeeping - Slip, trip, and fall hazards will be either removed or marked and barricaded. Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized and ice, snow, and mud will be cleared from steps to reduce slip hazards. Work to be completed in adequate natural light or assure sufficient illumination is maintained. Site personnel will conduct an initial walkover, and the "buddy system" will be implemented. Fall protection (railing or Fall Arrest Systems) will be installed if work is to be conducted at a level higher than 6 feet. See FLD 02, FLD 11, FLD 12, FLD 39.
	Manual lifting	Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.
	Inclement weather, heat/cold stress	Personnel will be dressed according to weather conditions. Workers will be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the UXOSO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.

Table 6-7: Hazard Analysis by Site Activity

Activity 3—Excavation Activities

Activity	Hazards	Hazard Control
	Moving/heavy equipment operations	Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel will be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.
	Hands or fingers caught between objects; abrasions and lacerations.	Personnel will be made aware of potential hazards and will coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for ice and rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. See FLD 10.
	Noise exposure	High noise areas will be identified. Hearing protection will be provided as appropriate. The latest ACGIH TLVs will be used. Personnel operating chainsaws will use hearing protection. Hearing control program, which consists of audiometric examination; training; use of hearing protection; and sound level pressure monitoring when and where necessary. See FLD 01.
	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 feet of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.

Table 6-7: Hazard Analysis by Site Activity
Activity 3—Excavation Activities

Activity	Hazards	Hazard Control
	Electric hazards	Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 feet from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35 and 38.
	Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.	Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.
	Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.	Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.

Table 6-7 Hazard Analysis by Site Activity
Activity 4—Digital Geophysical Mapping Activities

Activity	Hazards	Hazard Control
DGM surveying to delineate areas with potential DMM. Surveying accomplished via towed array methods.	***Chemical Hazards***—The potential for exposure to petroleum and diesel products exist for this task.	Vehicles will not be over-filled, and caution will be used whenever refueling. Refueling will not be conducted within 100 feet of an open flame.
	Physical Hazards—Slip, trips, falls; tools, terrain or vegetation, uneven walking surfaces; weather hazards; poor visibility.	The work area will be visually inspected. Housekeeping - Slip, trip, and fall hazards will be either removed or marked and barricaded. Materials will be stored to prevent intrusion into the work areas. Work areas will be kept organized and ice, snow, and mud will be cleared from steps

Table 6-7 Hazard Analysis by Site Activity
Activity 4—Digital Geophysical Mapping Activities

Activity	Hazards	Hazard Control
		to reduce slip hazards. Work to be completed in adequate natural light or assure sufficient illumination is maintained. Site personnel will conduct an initial walkover, and the "buddy system" will be implemented. Fall protection (railing or Fall Arrest Systems) will be installed if work is to be conducted at a level higher than 6 feet. See FLD 02, FLD 11, FLD 12, FLD 39.
	Manual lifting	Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.
	Inclement weather, heat/cold stress	Personnel will be dressed according to weather conditions. Workers will be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, and NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. As determined by the UXOSO, operations are to cease during severe weather conditions. An adequate supply of drinking water will be provided in all places of work. Cool water will be provided during hot weather. Portable drinking water dispensers will be serviced to ensure sanitary conditions and be clearly marked "drinking water." Water will not be dipped from containers. See FLD 02 – Inclement Weather.
	Moving/heavy equipment operations	Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel will be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel access will be restricted in area of operation. Back up alarms will be functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. The ground spotter will wear an OSHA approved hard hat. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.
	Hands or fingers caught between objects; abrasions and lacerations.	Personnel will be made aware of potential hazards and will coordinate carefully the handling and placement of heavy objects. Materials and objects

Table 6-7 Hazard Analysis by Site Activity
Activity 4—Digital Geophysical Mapping Activities

Activity	Hazards	Hazard Control
		being handled will be inspected for ice and rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. See FLD 10.
	Noise exposure	High noise areas will be identified. Hearing protection will be provided as appropriate. The latest ACGIH TLVs will be used. Personnel operating small gas engine equipment will use hearing protection. Hearing control program, which consists of audiometric examination; training; use of hearing protection; and sound level pressure monitoring when and where necessary. See FLD 01.
	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. All storage, handling, and use of flammables and combustible liquids will be in accordance with NFPA 30, 30A and carried out under the supervision of a qualified person. Only labeled/listed containers and portable tanks will be used for the storage of flammables and/or combustibles. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 feet of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.
	Electric hazards	Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 feet from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35 and 38.
	Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.	Use appropriate insect repellants. Training to avoid poisonous plants and avoid contact. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.
	Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material.	Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.

Table 6-7 Hazard Analysis by Site Activity
Activity 4—Digital Geophysical Mapping Activities

Activity	Hazards	Hazard Control
	Potential sun burn/sun poisoning hazard on bright, sunny days.	
		Digital Geophysical Mapping activities will be conducted in Level D PPE.

Table 6-7 Hazard Analysis by Site Activity
Activity 5—MEC Operations

Activity	Hazards	Hazard Control
MEC safety escort activities, mag & flag operations to locate potential buried UXO, excavation and removal of potential MEC anomalies, and destruction/ disposal of UXO and scrap materials.	Ordnance	All ordnance items will be positively identified prior to movement. Positively identify any fuzing associated with munition item. If found fuzed, do not handle. If unfuzed, may be moved to central location with approval of UXO Safety Officer. MEC operations will be conducted during daylight hours only. If an unknown ordnance item is found, the SUXOS will be notified. Do not approach a smoking white phosphorous munition; the burning white phosphorous may detonate the explosive burster at any time. Do not transport white phosphorous munitions unless they are immersed in water, mud, or wet sand.
	Demolition Operations-Unintentional Detonations.	All demolition activities will be performed in accordance with 60A-1-1-31.
	Chemical Hazards— White Phosphorous, Explosives.	Avoid movement of a white phosphorous munition. Avoid inhalation of and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.
	Physical Hazards—Slip, trips, falls, equipment, materials, tools, terrain, uneven walking surfaces; weather hazards; poor visibility.	The work area will be visually inspected. Housekeeping – Slip, trip, and fall hazards will be either removed or marked and barricaded. Geophysical teams will be dealing with uneven terrain. Slips, trips, and fall hazards will be the most prevalent. Sufficient illumination will be maintained to ensure a safe working environment and weather conditions to be continuously monitored. The "buddy system" will be implemented. See FLD 02, FLD 11,

Table 6-7 Hazard Analysis by Site Activity
Activity 5—MEC Operations

Activity	Hazards	Hazard Control
		FLD 12, FLD 39.
	Manual lifting.	Use proper lifting techniques such as keeping straight back, lifting with legs; avoid twisting back; use mechanical equipment or get help from others whenever possible. Heavy loads will be split into smaller loads and/or assistance sought. The path of travel should be cleared prior to the lift. See FLD 10.
	Inclement weather, heat/cold stress.	Personnel will be dressed according to weather conditions. Workers will be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the UXOSO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.
	Moving/heavy equipment operations	Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel will be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.
	Hands or fingers caught between objects; abrasions and lacerations.	Personnel will be made aware of the hazard and will coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. See FLD 10.

Table 6-7 Hazard Analysis by Site Activity
Activity 5—MEC Operations

Activity	Hazards	Hazard Control
	Noise exposure	High noise areas will be identified. Hearing protection will be provided as appropriate. The latest ACGIH TLVs will be used. Personnel operating chainsaws will use hearing protection. Hearing control program, which consists of audiometric examination; training; use of hearing protection; and sound level pressure monitoring when and where necessary. See FLD 01.
	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 feet of the fuel storage area, in construction equipment, and strategically in the construction area. All explosives to be stored in an approved ATF Type 2 Magazine. See FLDs 31 and 32.
	Electric hazards	Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 feet from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35, and 38.
	Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.	Use appropriate insect repellants. Training to avoid and identify poisonous plants, insects, and snakes. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.

Table 6-7 Hazard Analysis by Site Activity
Activity 5—MEC Operations

Activity	Hazards	Hazard Control
	Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.	Use sun block as appropriate. Avoid direct exposure to sun for long periods of time. There is no known source of radioactive material at this site.

Table 6-7 Hazard Analysis by Site Activity
Activity 6—Closeout Activities

Activity	Hazards	Hazard Control
Restoration of work areas and the demobilization of all remaining equipment, temporary structures, and other items from the project site after project completion.	***Chemical Hazards***—Contaminated source areas will have been removed, therefore, the risk level associated with these activities is low.	No intrusive measures allowed during this activity. Wear appropriate PPE for skin protection and to prevent dermal contact. Avoid liquid pools and stained areas if possible. An initial visual survey will be conducted to confirm the levels of protection are correct for the activity.
	Physical Hazards—Slip, trips, falls, equipment, materials, tools, terrain, uneven walking surfaces; weather hazards; poor visibility.	The work area will be visually inspected. Housekeeping – Slip, trip, and fall hazards will be either removed or marked and barricaded. Geophysical teams will be dealing with uneven terrain. Slips, trips, and fall hazards will be the most prevalent. Sufficient illumination will be maintained to ensure a safe working environment and weather conditions to be continuously monitored. The "buddy system" will be implemented. See FLD 02, FLD 11, FLD 12, FLD 39.
	Caught in/between/struck by or against an object.	Workers will stay out of the swing area of all equipment and will not walk, work or stand near equipment being loaded or unloaded. No personnel will ride on the equipment unless seats are provided. See FLD 20, 23, and 24. Workers operating equipment and/or exposed to traffic hazards will wear traffic/reflectorized vests and hard hats. The handling and placement of heavy equipment will be carefully coordinated. A

Table 6-7 Hazard Analysis by Site Activity
Activity 6—Closeout Activities

Activity	Hazards	Hazard Control
		traffic control system for positioning and moving haul vehicles will be established. Heavy vehicle operators may remain in their vehicles only if they have cab over protection. If operators must check loads, loading will cease until the operator is back in the cabin or away from the vehicles in a safe location. Materials and objects will be inspected for rough or sharp edges, and appropriate precautions will be taken to avoid contact. Personnel will wear work gloves and avoid placing hands between objects. Backup alarms will be in operable condition. Unnecessary backing will be avoided. Safety toe footwear will be required. Tools will be properly used.
	Moving/heavy equipment operations.	Only trained, experienced operators will operate equipment. Equipment will be inspected daily. Personnel will be made aware of the hazard and will coordinate carefully during handling equipment operations. Personnel restricted in area of operation. Back-up alarms functional. Stay out of the swing area of all equipment and from under loads. No personnel will ride on the equipment unless seats are provided. Guards will be kept in place during operation. Maintain safe distance from moving mechanical parts. Always use appropriate PPE. See FLDs 20, 22, 23, and 24.
	Fire	Flammable liquids will be stored in safety containers and flammable storage cabinets. Propane cylinders will be stored outside in secured areas. Fuel storage tanks will be placed in impermeable dikes. Properly rated fire extinguishers will be placed within 50 feet of the fuel storage area, in construction equipment, and strategically in the construction area. See FLDs 31 and 32.

Table 6-7 Hazard Analysis by Site Activity
Activity 6—Closeout Activities

Activity	Hazards	Hazard Control
	Noise exposure	High noise areas will be identified. Hearing protection will be provided as appropriate. The latest ACGIH TLVs will be used. Personnel operating chainsaws will use hearing protection. Hearing control program, which consists of audiometric examination; training; use of hearing protection; and sound level pressure monitoring when and where necessary. See FLD 01.
	Traffic	Work areas will be clearly barricaded using existing gates and appropriate signs displayed. Traffic will be rerouted as necessary. Persons working in traffic area, near roadways or directing traffic will wear high visibility (reflective) vests. Posted speed limit of 15 miles per hour. See FLD 20.
	Electric hazards	Generators will be grounded unless self-grounded. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 feet from overhead electric lines. Electrical installations will be made by qualified electricians. A lockout/tagout program consistent with FLD 42 will be used for equipment maintenance. Also refer to FLDs 34, 35, and 38.
	Inclement weather, heat/cold stress.	Personnel will be dressed according to weather conditions. Workers will be briefed and cognizant of heat and cold stress symptoms. Electrolyte/fluids replacement will be available to workers. Work rest periods will be established according to ACGIH, NIOSH guidelines, and FLDs 05 and 06. Personnel will be monitored. Salt will be applied to walkway and roadway surfaces where ice is a problem. As determined by the UXOSO, operations are to cease during severe weather conditions, see FLD 02 – Inclement Weather.

Table 6-7 Hazard Analysis by Site Activity
Activity 6—Closeout Activities

Activity	Hazards	Hazard Control
	Biological—Possibility of stinging and biting insects, poisonous snakes; possibility of exposure to poison ivy, sumac.	Use appropriate insect repellants. Training to avoid and identify poisonous plants, insects, and snakes. Adhere to WESTON Bloodborne Pathogens Exposure Control Plan—First Aid Procedures FLD 43.
	Radiation—There are no radiological hazards expected because past uses do not indicate the use of radioactive material. Potential sun burn/sun poisoning hazard on bright, sunny days.	Use sunblock as appropriate. Avoid direct exposure to sun for long periods of time.

Table 6-8

Equipment and Training Requirements

Task/Activity	Equipment	Inspection	Training
Preliminary Activities: Mobilization of personnel, equipment, and supplies to the project site, setup of office and storage areas, and implementation of explosive storage area security upgrades.	Magazine security upgrade equipment to be brought by subcontractor.	Subcontractors will be required to conduct daily inspections and necessary maintenance for the equipment. Follow WESTON Inspection requirements per WESTON Health & Safety Program.	Equipment will be operated by qualified operators. An initial site-specific training will be conducted. Daily safety meetings will be conducted before beginning the work. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of Material Safety Data Sheet (MSDS).
Site Preparation Activities: Site	Survey equipment to be brought by subcontractor.	Subcontractors will be required to conduct daily inspections and necessary maintenance for the	Workers involved in the clearing operation will be qualified and conduct

Task/Activity	Equipment	Inspection	Training
surveying to delineate work areas and clearing of brush and small vegetation less than 4 inches in diameter in work areas.	Weedwhackers and Chainsaws. Schonstedt GA52/72.	equipment. Follow WESTON Inspection requirements per WESTON Health & Safety Program. Weedwhacker and chainsaw operators will wear face mask, leg protection, hand protection, American National Standards Institute (ANSI)-approved footwear, and hearing protection. All equipment will be properly stored, inspected, maintained, and/or calibrated on a daily basis.	activities in accordance with OSHA 29 CFR-1910.266 and U.S. ACE EM 385-1-1 Section 31. Daily safety meetings will be conducted before beginning the work to stress the importance of conducting all activities in a safe manner. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDSs. Schonstedt's will be operated by qualified operators with 40-hr training with 8-hr refresher course.
MEC Operations: mag & flag operations to locate potential buried UXO, excavation and removal of potential MEC anomalies, and destruction/ disposal of UXO and scrap materials.	Hand tools and earth moving machinery, as necessary. Schonstedt GA52/72.	All equipment will be properly stored, inspected, maintained, and/or calibrated on a daily basis.	Daily safety meetings will be conducted before beginning the work to stress the importance of conducting all activities in a safe manner. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDSs. Schonstedt's will be operated by qualified operators with 40-hr training with 8-hr refresher course.

Task/Activity	Equipment	Inspection	Training
Closeout Activities: Restoration of work areas and the demobilization of all remaining equipment, temporary structures, and other items from the project site after project completion.	Hand tools and earth moving machinery, as necessary.	All equipment will be properly stored, inspected, maintained, and/or calibrated on a daily basis.	Daily safety meetings will be conducted before beginning the work to stress the importance of conducting all activities in a safe manner. Safe work practices and good housekeeping will be followed. Personnel will be informed of the contaminants and chemicals at the site and availability of MSDSs.

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7.0 LOCATION SURVEYS AND MAPPING PLAN

The tools and methodologies used for the efficient and accurate completion of surveying, mapping, and GIS operations are delineated in Chapter 7 of the PWP [Ref.1]. The plan is divided into three sections that are outlined as follows. The first section focuses on surveying and discusses the methodology and equipment to be used and the accuracy requirements to be met to locate and record spatial coordinates. The second section identifies the various hardware, software, data, personnel, and methods required to implement a fully functioning GIS. The final section discusses the necessary equipment, data, and structure for database design and information management.

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8.0 WORK DATA COST MANAGEMENT PLAN

Cost management and reporting will be conducted in accordance with the ESCA grant requirements and the Remediation Services Agreement between FORA and the LFR Team.

A schedule to complete the Phase II Seaside MRA Removal Action is presented in Appendix F.

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9.0 PROPERTY MANAGEMENT PLAN

Government property is not anticipated to be utilized during this project; therefore, the requirements of Chapter 9 of the PWP [Ref.1] are not applicable. If during the performance of this project, property is provided by the Federal Government it will be managed and maintained in accordance with Chapter 9 of the PWP following good commercial practices and the requirements of Federal Acquisition Regulation (FAR) Part 45, Government Property, including applicable FAR Part 52 clauses.

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10.0 SAMPLING AND ANALYSIS PLAN

The Sampling and Analysis Plan for this investigation and removal action is the OE Sampling and Analysis Plan (OESAP) [Ref.16] as found in Chapter 10 of the PWP [Ref.1]. The draft final version of the OESAP was distributed in December 2001.

It should be noted that the OESAP will not impact the operations being performed under this SSWP Addendum.

Sampling and analysis procedures as applicable to building removal are found in Appendix C.

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11.0 QUALITY CONTROL PLAN

11.1 Introduction

The QCP as presented in this section establishes and describes the quality requirements for the contractor services contract for the FORA ESCA Remediation Program. The QCP applies to all work performed by the LFR Team and their subcontractors. Site-specific additions to this QCP are included in Section 5 of this SSWP Addendum.

LFR and WESTON have each assigned a Quality Control Manager (QCM) to the project. The QCMs will ensure that this QCP provides an independent capability to ensure and verify that the quality objectives comply with prescribed criteria through surveillance, audits, and various document reviews.

Above all, project quality is the responsibility of the entire LFR Team. The team's comprehension of and adherence to this QCP is of primary significance for quality objectives to be accomplished; thus, training and indoctrination of the key personnel in the quality objectives will be conducted. The authorities and responsibilities of the key personnel are provided in Section 11.2.2 of this QCP. All UXOQC personnel reporting directly to the UXO QC Manager have the authority to identify deficiencies and propose and approve solutions. All UXOQC personnel have stop-work authority for all QC issues.

The organization structure ensures that quality is achieved and maintained by those personnel responsible for performing the work and that verification of quality is performed by personnel other than those who performed the work.

The original issue and the subsequent revisions to the QCP require approval of the LFR PM and the RPM. The adequacy and effective implementation of this program will be assessed semiannually by a management assessment team appointed by the PM and RPM.

11.2 Organization

11.2.1 General

Organizational responsibilities of FORA ESCA Remediation Program personnel are described in this section. An organization chart defining the lines of authority and responsibilities is provided on Figure 2-2.

11.2.2 Authority and Responsibility

The program organization is headed by the PM who is the single focal point for successful accomplishment of all phases and aspects of the FORA ESCA Remediation. The PM approves the QCP, implements procedures, and has direct responsibility for day-to-day operations of the program. The MEC and Geophysical aspects of the program are headed by the RPM. The PM and RPM responsibilities related to QC include, but are not limited to:

- Implementation of all applicable policies and procedures;
- Timely submission of all reporting requirements as outlines in this SSWP Addendum; and
- Analyzing QC failures with the QCM and field managers and ensuring that corrective actions have been appropriately implemented.

For purposes of this SSWP Addendum, the QCMs will report to the LFR and WESTON Corporate QA Representatives, and will interact with the PM and the RPM, respectively. The QCMs, as management representatives, have the following authorities and responsibilities:

- Ensuring that the QCP has been established, maintained, and implemented for the FORA ESCA Remediation Program;
- Establishing guidelines to assist in the development of program, project, site, and task specific QC policies and procedures;
- Initiating, recommend, approve, or provide solutions to the quality problems identified in QCP during system audits;
- Conducting periodic audits/inspections of the projects and sites and submitting reports to the Corporate QA Manager with copies to the PM or RPM, as appropriate; and
- Reporting the adequacy, status, and effectiveness of ongoing projects to the Corporate QA Manager.

All UXOQC personnel report to the WESTON QCM and WESTON UXO QC Manager on quality matters. On-site QC personnel have the responsibility for overall quality of work performed on site. Responsibilities include, but are not limited to:

- Developing QC procedures to implement the QC Plan;
- Verifying implementation of corrective actions;
- Initiating actions to identify and prevent the occurrence of nonconformance relating to the services and QCP;
- Authority to stop nonconforming work;
- Periodic coordination with EPA and DTSC QA representatives;

- Coordinating with the QCM to ensure that QC procedures are being followed and are appropriate in demonstrating data validity sufficient to meet DQOs;
- Recommending to the QCM the actions to be taken in the event of QC failures;
- Reporting noncompliance with QC criteria to the RPM and QCM;
- Any UXOQC person has the authority to suspend project activities when a condition adverse to quality is identified. The RPM and senior personnel responsible for clearance activities will be notified when such action is required;
- Conducting inspections of MEC portions of the GIS database;
- Preparing and submitting a daily QC report for Senior UXO Technical Manager review and record (this report is submitted by close of business the following day); and
- Conducting daily QC audits/inspection.

The QC Geophysicist reports to the QCM and is responsible for the quality of geophysical data. Responsibilities include, but are not limited to:

- Reviewing and implementing the geophysical portion of the project QCP;
- Performing checks and reviews of all raw and processed digital data;
- Performing periodic audits of geophysical teams;
- Conducting inspections of digital geophysical portions of the GIS database;
- Monitoring transfer of raw and processed geophysical data deliverables;
- Monitoring geophysical prove-out tests and results;
- Managing geophysical data;
- Recommending actions to be taken in the event of geophysical data QC nonconformance;
- Authority to initiate, recommend, and provide solutions to quality problems; and
- Authority to recommend suspension of project activities when a condition adverse to quality is identified.
- Additionally, UXOQC personnel are responsible for the following:
- Daily auditing of GIS data and the respective databases and
- Reviewing procedures and GIS personnel qualifications.

11.2.3 Personnel Selection, Indoctrination, and Training

Key personnel designated by the PM and RPM and those requiring licenses, certification, or other forms of qualifications necessary to perform their work will be selected and evaluated periodically or on each change of task assignment by program management.

This evaluation process is to ensure that credentials are current to perform the pre-established job description.

Project personnel performing functions that affect quality will receive, prior to assuming duty, indoctrination and training conducted in accordance with Section 11.11 of the QCP.

The job description, indoctrination, training, and certification will be maintained in the project files in accordance with Section 11.11 of the QCP.

11.2.4 Evaluation of QCP Implementation

LFR and WESTON Corporate QA representatives have the authority and responsibility to verify that the QCP has been implemented on the FORA ESCA Remediation Program. The LFR and WESTON Corporate QA representative will perform a scheduled, semiannual audit of the program activities and periodic surveillance in the manner described in Section 11.10 of the QCP. The results of these audits and surveillances are reported to the PM, RPM, and the LFR and WESTON QCMs, to provide a formal assessment of the QC program implementation.

11.3 Quality Program

11.3.1 Preparation, Review, and Acceptance of QCP

The QCP is prepared by the QCM and is reviewed and approved by the PM and RPM. After completion of the management review, the QCP will be submitted to FORA for review and acceptance prior to starting any operational activity. Revisions to the QCP will be reviewed and approved in the same manner as the original issue.

11.3.2 Preparation, Review, and Approval of Project Procedures

The Project Procedures will be reviewed by the QCM, relevant individuals and departments, and the PM and the RPM, and will be approved by the PM. Periodic changes to the procedures can be issued as FVFs. The FVF changes will be incorporated into the operating procedures. Each relevant supervisor/manager receiving the FVF will review the requirements with his/her staff on a weekly basis. At each update of the procedure manual, the PM or RPM will initiate a training program to indoctrinate the FORA ESCA Remediation Program staff to the requirements of the procedure update. The structure of project procedures is shown in Table 11-1.

11.3.3 Control of QCP and Project Procedures

Controlled copies of the QCP and the Project Procedures will be distributed to key project personnel. An electronic copy of the PWP [Ref.1] and SSWPs are available on the shared project drive.

11.3.4 Geophysical Survey QC

Geophysical Survey QC is an appropriate evaluation performed by WESTON for contractually defined products to assure that those products fully meet the prescribed requirements and comply with applicable laws, regulations, and sound technical practices.

The QC Geophysicist will be fully responsible for overseeing and documenting all QC performed with respect to the DGM surveys.

The basic QC steps for all digital and analog geophysical survey work on the FORA ESCA Remediation Program, along with the parties responsible for performing the QC, are presented in Table 11-2.

QC of the field data will be performed by WESTON before it is delivered to LFR, FORA, Regulatory Agencies, or any other stakeholder, and will include checks and reviews of the digital data deliverable. Specific checks will include data completeness, quality, and format checks. WESTON will confirm that the data have been reviewed by WESTON personnel. Data that have not undergone quality control checks will not be delivered to any stakeholder unless by mutual agreement.

If at any point during this process the data are found to be deficient, WESTON will take corrective action regarding the data in question.

Geophysical instrumentation utilized for QC of geophysical surveys will be similar in detection/discrimination ability to that used for the main data acquisition. Thus, if an EM61-MK2 is used in the main survey, an EM61-MK2 will be used for QC.

11.3.5 Geophysical Survey Quality Assurance

QA is an appropriate management review by a WESTON Senior Geophysicist of the overall effectiveness of the QC program, processes, and compliance. The QA procedures are the process by which WESTON fulfills its responsibility to be certain that QC is functioning and that the desired specific product (job result) is realized.

11.4 Document Control

11.4.1 General

A Document Control Log will be maintained for all the documents listed in Table 11-3.

11.4.2 Document Distribution and Retrieval

The most current revisions of documents that prescribe technical, management, and quality requirements are internally and externally distributed to personnel identified in the procedures. These personnel are responsible for the document's implementation and verification of its implementation.

The obsolete documents that prescribe obsolete technical and quality requirements will be clearly marked as obsolete and returned to the FORA ESCA Remediation Program Document Control Log upon receipt of any revised document. The recipient must also immediately conduct a page change for all affected documents by inserting the revised document in place of the obsolete one.

The FORA ESCA Remediation Program Document Control log must track all changes and ensure that all obsolete documents have been received from the appropriate personnel. Additionally, UXOQC will conduct random surveillance of documents in the field and for field office use to validate that the most current documents are in place and being implemented.

11.4.3 Field Records Management

Records (field data forms, field note copies, and PDA files) will be maintained in the on-site project office. All records will be stored such that they can be found using the date they were created, the team who created them, and a grid identification number. Field forms prior to the implementation of the PDA system will also be scanned for digital delivery.

11.4.4 Field Data Storage

Electronic data collected in the field will be stored in PDAs and synchronized daily. Data from the geophysical surveys will be downloaded from data loggers at regular intervals to ensure that the work performed will not be interrupted by a lack of storage capacity in the loggers.

See Section 5 of this SSWP Addendum and Chapter 7 of the PWP [Ref.1] for more details on Data Management Quality Control.

11.5 Inspection and Test Control

The Inspection and Test Control Plan is integrated into this SSWP Addendum.

11.5.1 Inspection and Test Plan

The Inspection and Test (I & T) Plan will be developed for each definable feature of work (e.g., mapping, geophysical investigation, explosive siting, etc.) to be performed. LFR Team will not release for use any item or system until all the activities specified in the I & T plan have been satisfactorily completed and the associated documentation is completed.

The I & T Plan will include a listing of items and the frequency and type of inspections and tests to be performed. Where an item or activity fails to pass any inspection or test, it will be identified as a nonconforming item (Section 11.7 of this SSWP Addendum) and corrective actions will be taken. The I & T plan will identify all inspections and tests necessary to assure compliance with the design document requirements. The four phases of inspection are as follows:

1. **Preparatory:** includes activities performed prior to beginning the work on each definable feature of work. Workers are brought together and the procedures that will be used to accomplish a feature of work are reviewed along with the associated quality and safety standards.

2. **Initial:** includes activities performed at the beginning of each definable feature of work. Initial work products are reviewed to insure compliance with the phases' quality requirements.

3. **Follow-up:** Includes daily checks to insure continuing compliance with contract and regulatory requirements.

4. **Final:** Includes a quality assurance test.

11.5.2 Final Inspection and Tests

QC personnel will ensure that all final inspection and tests have been conducted in accordance with the I & T plan. Product(s) will not be released for service prior to completion of all activities specified in the I & T plan and before the associated documentation is available and authorized. If an unverified product must be released for immediate use prior to acceptance, the product will be identified in a place where it can be recalled and replaced in the event a nonconformance is identified. If a nonconforming product is uncovered, it will be controlled in a manner specified in Section 11.7 of the QCP.

11.5.3 Records

QC personnel will document results of inspections and tests to include the following information:

- identity of the item or activity
- date of inspection
- identification of measuring and testing equipment used
- acceptance criteria
- results and indication of acceptability
- identity of the Quality Inspector

The I & T records providing evidence that the work has been inspected and/or tested will be maintained as a QC record in a manner specified in Section 11.7 and 11.10 of the QCP.

11.5.4 Equipment Maintenance and Tests

The LFR Team or their subcontractors will perform the activities listed in Section 2.0 of this SSWP Addendum. The processes and activities are controlled in accordance with the noted reference documents in this SSWP Addendum.

Preparatory Inspection of the project site is performed to determine the presence of environmentally sensitive areas, degree and type of vegetation cover, MEC and scrap contamination, the best geophysical instrument to be used and where, construction support, and restoration requirements.

11.6 Measuring and Test Equipment

11.6.1 Control of Measuring and Test Equipment

A procedure will be implemented to control, calibrate, and maintain measuring and test equipment (M&TE; including test software) used to indicate or record critical parameters or to demonstrate compliance to specified permits and requirements. The procedures will implement the following requirements:

- M&TE will be used in a manner that ensures that the measurement uncertainty is known and is consistent with the required measurement capability.
- M&TE will be selected to provide the proper range and accuracy for its intended use. The participant will identify and document precision and accuracy tolerances.

- Calibration checks will be conducted and records will be maintained to ensure that the M&TE remains accurate for its intended purposes.

11.6.2 Equipment Control

The procedure will identify the following requirements to control equipment in use:

- Determine the measurements to be made and the precision and accuracy required.
- Identify and document all M&TE to be included in the controlled inventory.
- Calibrate each item at prescribed intervals, or prior to use, using certified equipment having a known relationship to nationally recognized standards. Where no such standards exist, the basis for calibration will be documented.
- Define the process used for the calibration of M&TE, including equipment type, unique identification, location, frequency of checks, and the calibration method to include individual components and system (loop) checks, acceptance criteria, and actions to be taken if results are determined to be unsatisfactory.
- Identify M&TE with a label or identification record to show the calibration status.
- Maintain calibration records for M&TE.
- Assess and document the validity of previous test results or plant operation history when M&TE is found to be out of calibration by a prescribed and approved percentage.
- Ensure that environmental conditions are suitable for the calibrations, measurements, and tests being performed.
- Ensure that the handling and storage of M&TE ensures that accuracy and usefulness of M&TE are maintained.
- Safeguard M&TE from adjustments that could invalidate the calibration setting.
- Provide for regulatory agencies or their representatives to verify that M&TE is functionally adequate.

11.6.3 Instrument Calibration

The quality of geophysical data sets is dependent on the operational capabilities of the equipment used. By manufacturer's design, these instruments are calibrated at the time of manufacture and do not require field calibration. To ensure that equipment is fully capable and will perform in accordance with the manufacturer's specifications, pre-operational and post-operational checks will be performed. Following these checks, any equipment that is found unsuitable will be immediately removed from service. These checks will provide QC data indicating the proper functionality of the instruments.

Positioning equipment will be checked for proper operation by placing the system's antenna over a known point and recording the calculated location. For GPS units using real time corrections from a dedicated base station, the position repeatability standard will be ± 0.5 foot for RTK Differential GPS systems and ± 1.0 foot for ultrasonic positioning systems.

11.6.4 UXOQC Geophysical Inspections/Surveys

An inspection/survey is an activity that involves measuring, examining, testing, or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformance is achieved for each characteristic. QC geophysical inspections/surveys will be performed with the instrument type that was used initially for the activity being geophysically inspected/surveyed.

Individual sections of this work plan contain specific information regarding final acceptance, sampling inspection acceptance criteria, the inspection process, and the requirements for maintenance of inspection records. MEC removal operations that fail final acceptance will be controlled as a nonconforming condition as described in section 11.7. Grids and data/database information that fail final acceptance will be controlled by QC until verification of corrective action, final inspection, and acceptance has been completed.

11.6.5 QC Seeded Items

QC seeded items will be used as one of several quality control measures to ensure that personnel operating geophysical instruments (analog or digital) in the field for the purpose of locating buried ordnance items have performed their function in a quality manner. The method involves planting inert ordnance items in known locations where geophysical surveys will be performed and determining whether the items were found as a result of these surveys. The items will be placed at depths and orientations that, when surveyed effectively, will cause instrument responses that indicate the presence of a buried metallic item. This QC action will be performed in accordance with the SOPs for Seeding Quality Control Items for Quality Control Monitoring of Analog and Digital Geophysical Operations presented in Standard Operating Procedure of the PWP [Ref. 1, Appendix G].

11.6.6 Equipment Maintenance and Tests

Measurement equipment utilized on site (i.e., magnetometers, monitors, geophysical mapping equipment, etc.) is checked for operational reliability.

Inasmuch as possible, equipment used on the FORA ESCA Remediation Program is dedicated solely to the project until the project is completed. At times, it will be necessary to rent equipment to meet surges. Equipment such as vehicles, backhoe, and

chipping/grubbing equipment have before, during, and after operation maintenance performed in accordance with the equipment's operating manual. The UXOQC staff is specifically responsible for inspecting the equipment and its maintenance records. If equipment field checks indicate that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment is tagged and removed from service. The PM or RPM is notified and a request for replacement equipment is placed immediately. Replacement equipment must meet the same specifications for accuracy and precision as the equipment removed from service.

The following equipment requires daily maintenance or tests: geophysical survey instruments (e.g., Schonstedt magnetometers, Geonics EM61-MK2, and Geometrics G-858) and GPS Receivers. Instrument standardization checks are described in Section 5 of this SSWP Addendum.

11.6.7 Preventive Maintenance

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations.

The manufacturer's written maintenance schedule will be followed to minimize the downtime of the measurement system. It will be the operator's responsibility to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. At a minimum, equipment used daily will be kept in good operating condition. Qualified personnel will perform service to the equipment instruments, tools, etc.

11.6.8 Equipment Spare Parts

An extra battery pack for each type of geophysical instrument will be on site at all times. A back-up geophysical instrument will be kept on site or arrangements will be made with an equipment vendor so that replacement equipment or any spare parts needed can be delivered to the site by overnight delivery.

11.7 Nonconforming Items or Activities and Corrective Actions

11.7.1 Identification

Circumstances that prevent a work process to control the output from conforming to the contract requirements will be promptly identified, documented, investigated, and corrected appropriately. All project personnel have the responsibility, as part of their normal work duties, to promptly identify and report conditions adverse to quality. The methodology for the nonconformance report (NCR) process is described in the PWP, Nonconforming Items or Activities and Corrective action SOP [Ref.1, Appendix G]. The

status of NCRs will be maintained in a log and progress of their resolutions will be documented and reviewed monthly to ensure prompt attention to their conclusion.

11.7.2 Resolution, Corrective Action, and Verification

The appropriate level of management is responsible for evaluating the cause of an NCR and will recommend solutions for correcting the deficiency identified. Actions and technical justifications for an action proposed to resolve the corrective action will be reviewed and approved by personnel responsible for the technical aspect of the work. The QC organization will be responsible for verifying implementation of corrective action, monitoring the effectiveness of preventive action, and reporting any findings to the QCM.

UXOQC will maintain the NCR log that identifies the nature, location, and status of all NCRs. The NCR log status will be briefed to FORA weekly in addition to copies of all closed-out NCRs.

11.7.3 Material and Item Nonconformance

The QCMs ensure that the following requirements are implemented:

- Items that do not conform to prescribed technical and/or quality requirements are tagged or otherwise identified, documented, and reported as nonconforming. The documentation will include the following information:

a. Identification of the nonconforming activity, material, or item.

b. Identification of the technical and quality requirement(s) with which the activity, material, or item is not in compliance.

c. Identification of the current status of the activity, material, or item (i.e., whether the item is on hold or whether its use is conditional).

d. Names and dates of the individuals identifying the nonconformance.

e. Identification of the individual(s) or organization(s) responsible for resolution.

f. Indication of the severity of the nonconformance(s).

g. Indication regarding the continuance or stoppage of work associated with each nonconforming activity, material, or item.

h. Nonconforming materials and items are segregated, when possible, from conforming materials and/or items to the extent necessary to preclude their inadvertent use.

i. The status of nonconforming activities, materials, and items and the progress of their resolution are documented and routinely reviewed to ensure prompt attention to conclusion.

11.7.4 Review and Disposition of Nonconformance

The review is conducted by the PM or RPM, QCMs, and QC personnel to ensure that:

- The responsibility for review and disposition of nonconformance is defined.
- Nonconforming materials and items are reviewed in accordance with procedures.
- Nonconformance can be evaluated according to four criteria:
  a. Reworked to meet the original requirements
  b. Accepted with or without repair by the designer
  c. Re-graded for alternative applications
  d. Rejected or scrapped
- Repaired or reworked materials and items are re-inspected.
- Each document used to identify and correct nonconforming conditions allows for the evaluation and approval of proposed actions by the appropriate authority.

11.7.5 Trend and Root Cause Analysis

The trend analysis of QA audits, subcontractor/supplier surveillance reports, and nonconformance will include the following information:

- Total number of audit findings and observations, surveillance reports, and NCRs for each area of the QCP.
- A summary of the root causes for the nonconformance consolidated for each area of the QCP.
- Trends that are developing or that have developed.

The PM and RPM, as a part of the semiannual assessment, will perform the trend analysis once every year. QCM will verify the implementation of any preventive actions resulting from the trend analysis. The method for conducting root cause analysis of nonconformities identified by NCRs, customer complaints, and how to evaluate the need for action to ensure that the nonconformities do not recur, is presented in the PWP Corrective and Preventive Action SOP [Ref.1, Appendix G]. This procedure also establishes the methodology to conduct trend analysis of nonconformities identified through NCRs, corrective actions, quality surveillance reports, and internal audit results.

The QCM is responsible for evaluating on a semiannual basis all NCRs affecting quality and will recommend solutions as well as steps for verifying their implementation.

The management assessment will propose and initiate measures necessary to deal with any problems requiring preventive action. When preventive action necessitates a revision to the project procedures, the PM and RPM will issue an administrative FVF describing

the necessary change. The QCM will verify implementation of the preventive action during the audit.

11.7.6 Lessons Learned

The LFR Team will capture lessons learned in each individual AAR, which will be forwarded to the QCMs. Lessons learned will be reviewed and distributed to other applicable projects.

11.8 Handling, Storage, and Preservation

11.8.1 General

Requirements of this subsection of the QCP will apply to handling, storage, and preservation of explosives as specified in Section 3, Explosive Management Plan, and Section 4, Explosive Siting Plan.

11.8.2 Handling of Design Documents

All design documents prepared for contractual submittal to the regulatory agencies will be submitted to Document Controls after all specified internal reviews are completed. The original design documents will be logged and retained on file as specified in Section 11.9 of the QCP.

11.8.3 Handling of Materials and Items

The following requirements specified in Sections 11.8.4 through 11.8.6 for handling, storage, and preservation of materials and items will be implemented.

11.8.4 Handling

Proper handling ensures that the following requirements are met:

- The selection of equipment to be employed in handling items is reviewed to ensure adequacy with respect to capacity, range, and method(s) of contact with the item.
- Techniques to be used in handling items are documented and reviewed to ensure adequacy.
- Equipment used in the handling of items is inspected and/or tested at routine intervals to ensure its fitness for service.

- Operators of handling equipment are qualified and, when required by code, regulation, or procedure, certified to operate the equipment.
- Control of lifting and moving heavy equipment.

11.8.5 Storage

A detailed requirement for storage of materials and items ensures:

- Materials and items are protected in storage to the extent necessary to preserve their usefulness, including the maintenance of protective environments and conditions established by or recommended by the manufacturer or supplier.
- Identification markings, tags, or labels are maintained.
- Measures are established and implemented to ensure that special storage conditions are routinely identified and reviewed, including identification of shelf-life, temperature conditions, and moisture levels.
- The authorities necessary for transactions to and from storage areas are defined.
- Items in stock are assessed upon arrival and at defined intervals during storage in order to detect deterioration.

11.8.6 Preservation

The LFR Team will implement appropriate methods for preservation and segregation of items when the items are under LFR Team control to include preventive maintenance as recommended by the manufacturer or supplier.

11.9 Records and Publications

11.9.1 Identification

Records are documents or other media that prescribe technical or quality requirements or that provide evidence of quality achievement for materials or items. These records are identified as documents prepared, reviewed, or approved in this QCP and implementing project procedures. Records are uniquely identified for ready access and retrieval.

Records that are required to be retained are identified in project procedures. These records and documents will, at a minimum, apply to inspection, audits, and surveillances of: MEC records, hazardous waste management, environmental restoration, and training.

11.9.2 Authentication

The validity of documents submitted for use as a record is ensured through management review of correspondence, a lead discipline engineer's review, and QCM review for compliance with project procedures.

All correspondence to FORA is signed by the PM and RPM (or designee) after completion of satisfactory management review.

The authorizing signatures appear on the documents where provision has been made; e.g., the signature or initials of the authenticating person will appear for correspondence, drawings, and calculations.

11.9.3 Storage

The records will be retained in a record facility providing protection from deterioration, theft, and damage, including implementation of measures in consideration of wind, flood, fire, temperature, moisture, pressure, erasure, exposure to light, or injurious insects, mold, and rodents. Electronic storage will be considered dual storage. Dual storage facilities will be sufficiently remote from each other to reduce the chance of a simultaneous hazard.

11.9.4 Logs and Records

For all site work where PDAs are used, observations will be noted that might affect the quality of data.

The UXOQC inspects all grid operations records on a daily basis. These inspections focus on the completeness, accuracy, and logic of the records. The results of these inspections are entered directly into the project database.

Following are the types of records expected to be prepared and maintained for this work:

Anomaly Excavation Records

The UXO Team Leaders prepare individual records for each operating grid. This record consists of fields that are used to record data on the excavation of anomalies and work conducted. This data is downloaded daily into the project database through synchronization of the UXO Team Leader’s PDA. This data is reviewed by the SUXOS, UXOQCS, and the GIS Manager for completeness, accuracy, and overall quality the following work day.

Safety Log Book

The UXOSO maintains these logs. The logs are used to record all safety matters associated with the specific project such as: safety briefings/meetings (including items covered and attendees), safety training, safety audits, near-misses/accidents/incidents with cause and corrective action taken, weather conditions, and any other matters relating to safety.

Training Records

The UXOSO maintains training records for all site personnel. These records contain training certificates, licenses, and other qualifying data for an individual's duty position.

Visitor's Log Book

The UXOSO maintains this log. All personnel who are not directly involved in the project site activities are identified in this log by name, company, date, time in/out, and a contact phone number. Safety briefings and training for visiting personnel are also recorded in this log.

Photographic Log

Photographic logs are maintained by various functional departments and will be retained until the end of the project. These logs are used to record all video recording and photographs taken to document work and/or site conditions.

Correspondence Log

The Office Administrator generates individual correspondence numbers for all outgoing correspondence and maintains a log of all outgoing and incoming correspondence.

Site Maps

The PM, RPM, and GIS Manager maintain current working maps of the operating areas in the field office throughout execution of this project. These maps are used to document MEC encountered and the locations of soil sampling, auguring, drilling, and other soil-disturbing activities.

11.9.5 Publications

The LFR Team compiled a list of required publications to be maintained at the site. In addition to this list, WESTON will make available, in a timely manner, any additional manuals the SUXOS may require. Prior to the start of operations and periodically throughout the project, the UXOQCS checks to ensure that site publications are present and in good repair. Results of these inspections are recorded and reported. Currently identified publications include:

- Copy of all Task Orders
- WESTON's Safety and Health Program
- OSHA, 29 CFR 1910, General Industry Standards
- 27 CFR Part 55, Commerce in Explosives
- OSHA, 29 CFR 1926, Construction Standards
- ATF P 5400.7, Alcohol Tobacco, Firearms and Explosives Laws and Regulations
- NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities
- ACGIH, TLVs for Chemical Substances and Physical Agents and Biological Exposure Indices
- Applicable sections of EPA, 40 CFR Parts 260 to 299, Protection of Environment
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation
- CESPK EM 385-1-1, Safety and Health Requirements Manual
- CESPK ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions
- DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards
- DOD 4160.21-M, Defense Reutilization and Marketing Manual
- DA PAM 385-64, Ammunition and Explosives Safety Standards
- AR 385-64, Ammunition and Explosives Safety Standards
- AR 200-1, Environmental Protection and Enhancement
- AR 385-10, The Army Safety Program
- AR 385-16, System Safety Engineering and Management
- AR 385-40 w/CESPK supplement, Accident Reporting and Records
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives
- TM 60 Series Publications
- EM 1110-1-4009, Ordnance and Explosives Response

11.10 AUDITS AND SURVEILLANCES

11.10.1 Audit Planning

An LFR and WESTON Corporate QC representative will perform semiannual audits of the program activities, and audits of subcontractors/suppliers and of the environmental compliance program, as required in a manner specified below:

- All areas of the activities being performed (where audits are not planned for certain areas, the audit schedule will include an appropriate justification for the course of action).
- The audit schedule will identify office(s), including those in the subcontractor's organization, to be audited.
- The audit schedule will identify the sequence and dates of audits for a fiscal year.
- Before each fiscal year, the PM and RPM will approve the audit schedule for the fiscal year. The lead auditor will prepare the audit plans. The plan will be reviewed and approved by the LFR and WESTON Corporate QA Manager before execution.
- The audit plan will include the following information:
- Identification of the organization and work areas to be audited.
- Identification of location, times, and dates of the duration of the audit.
- Identification of the documents that specify the criteria against which the work will be measured.
- Checklists prepared as guides during the audit.
- Identification of auditing personnel.
- Signatures and dates approving the audit.
- The organization to be audited will be notified of the impending audits at least 15 days in advance.

11.10.2 Audit Personnel

The lead auditor will be qualified and certified. The lead auditor will be responsible for the organization and coordination of the planning, execution, and reporting of the audit. Auditors will not be responsible for the work being audited.

The QCM will be a qualified lead auditor, and is responsible for reviewing the response to the audit report and for the verification phase of the audit.

11.10.3 Audit Execution

A pre-audit briefing and a post-audit briefing will be conducted to inform the management of the organization being audited or to confirm the results of the audit, including concerns and findings. Daily briefings may be conducted, as needed, to inform the audited organizations of the progress of the audit and potential findings or concerns.

11.10.4 Audit Reporting

The audit results approved by the lead auditor will include the following information:

- Reference to audit plan.
- Identification of and justification for any differences that occurred between the audit plan and the actual conduct of the audit.
- Synopsis of the audit results.
- Description of nonconformity (identified as findings and observations).
- Completed audit checklist and documentation (objective evidence) supporting the discovery of the nonconformity.

Conditions determined to be in nonconformance with the contract, procedure, or other specified requirements, are identified as findings. Conditions that are not in nonconformance when first identified, but could lead to nonconformance if left uncorrected, are identified as observations. Formal responses are required for findings only. Corrective action is required for both findings and observations.

The lead auditor (may be the QCM) will issue the audit report to the Corporate Quality Assurance Representive(s). The QCM will distribute the report to the PM or RPM depending on which company is performing the audit. The PM and RPM will issue the audit report to the subcontractors and suppliers audited.

11.10.5 Review and Approval of Recommended Action Response

The recommended corrective action proposed by the management of the organization audited in response to the nonconformity will be reviewed and approved by the QCM. Justification for rejection of the response will be documented by the QCM and transmitted to the organization providing the response.

11.10.6 Verification of Closeout Action

The management of the organization that is being audited will report the implementation of corrective action to close out the audit nonconformity. The lead auditor or the QCM will verify a closeout action at the time of the next scheduled audit.

Verification of closeout action will be documented to ensure the satisfactory closure of the audit nonconformity and will be reported to the PM or RPM and to the management of the organization audited, when applicable.

11.10.7 Surveillances/QC Audits

UXOQC personnel will perform scheduled (daily) and unscheduled surveillances/QC audits of the program activities to supplement the audit process so that confidence in the quality of items is maintained without duplication of effort. These QC audits will include, but not be limited to:

- equipment calibration audits
- property accountability audit
- MEC-related task audits
- search effectiveness audits
- equipment operator maintenance audit
- PPE audits

The surveillance will be conducted by personnel who do not report to management or to the supervisors immediately responsible for the work being evaluated. The surveillance report will document the objectives, scope, and basis of the surveillance conducted, along with the description of nonconformance(s). The surveillance report will be discussed and coordinated with the individual or group responsible for the document or activity evaluated and will be reported to the PM or RPM. The PM or RPM (or designee) will provide corrective action to the surveillance within 4 weeks from the date of issue of the surveillance report. The QCM is responsible for verifying the corrective action as soon as practical following the implementation of the corrective action.

11.10.8 Stop Work

When the QC audit, surveillance, or inspection nonconformance remains open past the recommended period for corrective action, the PM or RPM will first be notified that a stop-work order will be issued if the corrective action has not been taken. When activities stemming from such nonconformance continue to compromise safety or produce unsatisfactory work on critical and significant items, the QCM will issue a stop-work order until the nonconformance is corrected.

11.10.9 Records

The surveillance and audit reports will be maintained as records in the manner established in Section 11.9.

11.11 Training

11.11.1 General

Qualifications and training of all project personnel will comply with DDESB requirements.

11.11.2 Qualification Requirements

Personnel whose job requires the use of detectors or use of innovative detection techniques/equipment will be tested for proficiency in accordance with the PWP; the UXO Technicians Analog Locator Quality Control Qualification SOP [Ref.1, Appendix G]. Qualifications will be conducted at the Geophysical Test Plot (See Section 5.17.2.6).

11.11.3 Training for UXO Personnel

For all UXO personnel assigned to this project, training includes the following courses:

- Prior to the start of any intrusive on-site operations, LFR and WESTON will submit copies of the OSHA Training Certificates for the above training to FORA for review and approval. Under no circumstances will any person be allowed to engage in intrusive activities until the requisite training is verified by FORA.
- All site personnel will be trained to a clearly identifiable and consistent standard, because all personnel will receive the same training.
- The training provided can be tailored to not only meet the regulatory requirements, but to address specific safety and health issues associated with this particular site and operational conditions.
- Tracking, scheduling, and performing annual refresher training will be made easier by establishing a standardized start time for each individual's qualifications.
- In addition to the OSHA required training, UXO-qualified personnel receive the comparable training as provided to non-UXO personnel.

11.11.4 Training for Non-UXO Personnel

Prior to commencing site activities, WESTON conducts required training for all non-UXO personnel assigned to this project. This training includes the following courses:

- MEC Recognition Training;
- Familiarization with the current Work Plan;

- Site-Specific Safety And Health Plan orientation and PPE training, hearing protection, and donning and doffing of PPE;
- Instruction applicable to equipment operation and maintenance with emphasis on safety procedures to be implemented, which will require operator qualification;
- A discussion of environmental considerations specific to the FORA ESCA Remediation Program;
- Employees must meet the standards of OSHA (29 CFR 1910.120). The employees will complete the OSHA training as described in paragraph 6.4.2.1; and
- Daily Safety and Tailgate Training: Briefings outlining the day's activities, unique hazards and safety precautions, and other operational issues related to the project.

The UXOSO and others conduct training as applicable. Records of attendance (and student performance when applicable) are recorded. Upon completion of Safety and Equipment Operator's Training the employee is issued a certificate of training and a copy of this certificate is placed in the site personnel record. Prior to assignment to a duty position or change in duty position, the UXOQCS performs a check of the individual's site personnel record to ensure that the employee is qualified to fill the position.

Personnel involved in activities affecting the quality of operations and QC personnel assigned the responsibility for verifying the adequacy of MEC removal activities, clearance activity, environmental sampling, and related testing will be trained and certified.

11.11.5 Training Requirements

Personnel and subcontractors assigned on the FORA ESCA Remediation Program to perform activities affecting quality and safety will be trained to the project requirements and to the requirements of the QCP, as well as to the project and safety procedures. The project procedure will establish a formal training and qualification program.

The training program will ensure that project personnel:

- Possess adequate knowledge of the processes and procedures needed to conduct assigned tasks;
- Have working knowledge of the tools to be used;
- Possess an understanding of acceptance and rejection criteria for the work process;
- Understand the safety conditions/requirements of the work task. Safety training for all on-site personnel will consist of daily tailgate safety meetings and weekly Safety Manager meetings;
- Know the consequences of inadequate quality levels;
- Are provided training for continued maintenance of job proficiency; and

- Are aware of the quality improvement and empowerment responsibilities.

Quality Control staff including subcontractors at the site will complete the Corps of Engineers "Construction Quality Management for Contractor's Training Course," as necessary. This will be evaluated by the QCM on a case by case basis.

All visitors will be required to go through a safety training and orientation to the general and specific hazard requirements.

Training programs will describe the initial, refresher, and replacement training to be conducted.

Training records including qualifications and certifications will be maintained as project records in Document Controls files in accordance with requirements in Section 11.9.

11.12 QUALITY IMPROVEMENT

11.12.1 General

Measurable objectives and goals will be implemented to solicit customer feedback in order to improve the quality management process continually.

11.12.2 Goal and Objectives

The PM will establish measurable quality goals and objectives at relevant functions and levels within the project organization. The PM will measure these goals and objectives periodically and will identify any improvements needed from the measurements.

11.12.3 Customer Feedback

Management assessments, NCRs and trend analyses, and client feedback received during the course of the project execution will be considered as customer feedback by project management. All client concerns will be addressed by the PM in correspondence to the client.

11.12.4 Improvements

The measurements and feedback received by project management will be analyzed to identify improvement opportunities in the quality management system, processes, items, products, or services. Implemented improvements should be monitored by the PM to verify their effectiveness.

12.0 ENVIRONMENTAL PROTECTION PLAN

12.1 Introduction

12.1.1 Purpose

This Environmental Protection Plan (EPP) outlines the procedures that will be implemented to protect natural resources. The EPP will comply with the Installation-Wide Multispecies HMP for former Fort Ord (HMP) [Ref. 17] during removal activities in the Seaside MRA. The HMP incorporated conservation measures pursuant to U.S. Fish and Wildlife Service (FWS) Biological Opinions (BOs) dated prior to issuance of the HMP in April 1997. Specific to this Work Plan, MEC activities were addressed in Chapter 3 of the HMP. Since April 1997, a number of BOs have been issued that are relevant to the activities contemplated in this Work Plan [Ref. 26, 27, and 28]. Accordingly, some information has been updated and additions have been added to this section so that this SSWP Addendum will be consistent with currently applicable conservation measures.

This EPP incorporates the PWP [Ref.1] and defines additional site-specific elements.

12.2 Description of Sites and Natural Resources

The Seaside MRA (MRS-15 SEA 1–4) is located in the southwestern portions of the former Fort Ord, and fall within the borderland development areas along the natural resources management area (NRMA) interface, as designated in the HMP. The four sites within the MRA form a contiguous narrow parcel along the west and north boundaries of the NRMA, ranging from the north boundary of the City of Del Rey Oaks, along General Jim Moore Boulevard and Eucalyptus Road on the north edge of the NRMA. All vegetation within the MRSs of the Seaside MRA was mechanically or manually cut to support the TCRA and NTCRA that were conducted by the Army in the late 90s. Wetland or vernal pond areas are not present at any of the sites.

12.2.1 MRS-15SEA.1

The MRS-15SEA.1 site is approximately 198 acres and extends from the north boundary of MRS-15SEA.1 north to Broadway Road. All vegetation within the MRSs of the Seaside MRA was mechanically or manually cut to support the TCRA and NTCRA that were conducted by the Army in the late 90's. The current vegetation may include early seral stages of maritime chaparral. The topography of the site is flat to gently rolling terrain. This MRS is located within 1 to 2 kilometers (km) of a known or potential breeding habitat of the California Tiger Salamander (CTS). The CTS is listed as a threatened species under the Endangered Species Act. Therefore, CTS may occur and the

applicable Terms and Conditions of the 2005 Biological Opinion will be implemented during MEC removal actions (see Section 12.3.2.2 below).

12.2.2 MRS-15SEA.2

The MRS-15SEA.2 site is approximately 97 acres and extends from Broadway Road north to the corner of Eucalyptus Road and General Jim Moore Boulevard. All vegetation within the MRSs of the Seaside MRA was mechanically or manually cut to support the TCRA and NTCRA that were conducted by the Army in the late 90's. The current vegetation may include early seral stages of maritime chaparral. The topography of the site is flat or gentle to moderately rolling terrain.

12.2.3 MRS-15SEA.3

The MRS-15SEA.3 site is approximately 48 acres and is located at the corner of Eucalyptus Road and General Jim Moore Boulevard. All vegetation within the MRSs of the Seaside MRA was mechanically or manually cut to support the TCRA and NTCRA that were conducted by the Army in the late 90's. The current vegetation may include early seral stages of maritime chaparral. The terrain is flat to gently rolling.

12.2.4 MRS-15SEA.4

The MRS-15SEA.4 is approximately 76 acres and extends from MRS-15SEA.3 to slightly past the eastern edge of Range 46. All vegetation within the MRSs of the Seaside MRA was mechanically or manually cut to support the TCRA and NTCRA that were conducted by the Army in the late 90's. The current vegetation may include early seral stages of maritime chaparral. The terrain is gentle rolling.

12.3 Protection and Conservation of Natural Resources

Each MRS-15SEA.1-4 site is designated in the HMP for development. However, the sites fall within borderland development areas along the NRMA interface designated in the HMP. Therefore, a habitat checklist will be filled out and measures to reduce impacts to natural resources will be implemented. In addition, guidelines that minimize activities that could degrade lands through soil erosion or invasive weed problems will be followed. These considerations will be addressed in this section.

The LFR Team Field Biologist will be regularly present on work sites to conduct and/or confirm that these environmental directives are being followed. The Field Biologist will also document and address as needed unforeseen environmental concerns, as they may occur. The LFR Team will coordinate with the Fort Ord BRAC Office as needed on environmental issues that are not addressed in the HMP.

12.3.1 Interim Management Requirements

The LFR Team will comply with interim management requirements as outlined in the PWP [Ref. 1]. These requirements might include installing boundary markers (where appropriate) to separate MEC work sites from designated habitat reserve areas and implementing other measures to avoid disturbances to adjacent land parcels. To reduce soil erosion, erosion control measures - the application of certified weed-free straw or the installation of structures such as water bars - will be implemented, as necessary.

12.3.2 Avoidance and Mitigation of Environmental Impacts During Removal Activity

12.3.2.1 Removing Vegetation

A combination of mechanical and manual vegetation removal methods will be used to clear brush. Vegetation will be cut in accordance with procedures defined in Chapter 2 of the PWP [Ref. 1].

12.3.2.2 Minimizing Impacts to Habitat and Endangered, Threatened and Rare Species

The LFR Team approach will minimize and avoid disturbances to areas with sensitive species as much as possible without unreasonably disrupting removal activities. The Field Biologist will conduct a preliminary environmental survey of the sites to identify locations of sensitive species. Vehicle access will be restricted to roads and removal activities will be coordinated so that they avoid HMP-listed species, where feasible.

HMP Mitigation Measures

The mitigation measures listed in Chapter 3 of the HMP for “Ordnance and Explosives Removal” are not required for development parcels. Most of the parcels within the Seaside MRA are designated for development, which do not require HMP mitigation. However, because the eastern boundary of the Seaside MRA is identified as ‘borderlands,’ mitigation measures as identified in Chapter 4 of the HMP will be implemented.

Since the HMP was developed, additional biological opinions potentially relevant to this SSWP have been issued by FWS [Ref. 26, 27, and 28]. Relevant mitigation measures from these BOs not included in the HMP will be implemented as part of this SSWP as summarized below.

California Tiger Salamander Mitigation Measures

Conservation measures relative to the CTS as provided in the FWS BO [Ref. 28] that are relevant to the activities included in this SSWP will be implemented by the Field Biologist.

12.3.2.3 Site Restoration and Monitoring for Invasive Weeds

The LFR Team Field Biologist will assess the need for site restoration and will coordinate the work. Site restoration will likely be limited to basic erosion control measures as outlined in the HMP (e.g., straw application and straw crimping). The Field Biologist will also perform informal follow-up monitoring of the site for erosion or invasive weed problems before a land transfer.

Implementation of site closure, restoration, and monitoring (SCRM) for the Seaside MRA will involve interim measures because it is designated for development. These measures will minimize subsequent impacts on sensitive species and prevent site degradation and/or impacts on adjacent areas and sensitive habitats. The following SCRM measures will be implemented.

1. All trash associated with the construction work that could attract predators to the site will be removed upon completion of construction work.

2. Per the HMP, excavated areas will be allowed to revegetate naturally.

3. Excavations that result in steep-sided depressions without a gently sloping egress area that occur within 2 km of a potential CTS breeding site will be filled with soil to approximately match adjacent ground level to prevent trapping or breeding of CTS during the wet season.

4. To reduce soil erosion, erosion control measures—the application of certified weed-free straw and straw crimping or the installation of structures such as water bars—will be implemented, as necessary.

5. Invasive weed control: surface soil-disturbed areas will be mapped via GPS and will be monitored within two months following the end of the current wet season (if construction occurs during the wet season) or next wet season (if construction occurs during the dry season) to determine if invasive weeds have colonized the disturbed areas. If invasive weeds are present, they will be removed by hand or other approved method and measure (4) above will be implemented on any newly surface soil-disturbed portion(s) of the area. Areas will be monitored at least once per year for five years, but monitoring will be terminated sooner if development construction begins in the area.

13.0 INVESTIGATION-DERIVED WASTE PLAN

Investigation-derived waste (IDW) for this investigation and removal action will be managed in accordance with the IDW plan in Chapter 13, Investigation Derived Waste Plan of the PWP [Ref. 1]. Waste characterization and disposal will be performed in accordance with the Department of Toxic Substances Control regulations outlined in Title 22 CCR Division 4.5. IDW that could be generated can include, but not be limited, to the following:

- Used PPE
- Decontamination fluids
- Hazardous Materials Packaging
- Painted/contaminated lumber
- ACM
- Metal waste
- Contaminated Soil

Procedures outlined in the IDW Plan will be coordinated with the Army and FORA, as appropriate. FORA will be the waste generator for the Phase II Seaside MRA Removal Action and will sign all manifest documentation prior to shipment offsite. As their contractor, the LFR Team will prepare manifest documentation for FORA signature, ship, and dispose of IDW. IDW operations will be conducted in accordance with this IDW Plan.

The management of IDW will depend on whether the IDW is hazardous or nonhazardous. To make this determination, waste will initially be segregate according to the type of material and according to the activity conducted that generated the IDW to prevent cross contamination. General protocol for the management of each type of IDW is outlined below:

- Used PPE will be disposed of as nonhazardous solid waste unless there is evidence of gross contamination, in which case the PPE will either be disposed as hazardous waste or sampled and chemically tested to confirm a designation as non-hazardous.
- Decontamination fluids will be containerized in DOT-approved 55-gallon drums or in temporary polyethylene storage tanks. When full, the drum and/or tank contents will be sampled and the samples submitted to an EPA–approved analytical laboratory for chemical analysis. The decontamination fluid containers will be labeled “Potentially Hazardous Waste Pending Further Investigation” until a hazardous or non-hazardous determination can be made based on the laboratory analysis results. The contents will then be disposed of appropriately based on the hazard designation.
- Hazardous materials packaging will be either returned to the manufacturer for recycling or reuse as appropriate, or will be disposed of an a nonhazardous waste, unless there is evidence of gross contamination, in which case the packaging will

either be disposed as hazardous waste or sampled and chemically tested to confirm a designation as non-hazardous.

- Painted building debris will be inspected for lead-based paint or will be assumed to contain lead unless determined otherwise by sampling and chemical testing. Building debris containing lead will be segregated and characterized for disposal at an appropriately permitted landfill. A detailed plan describing appropriate building demolition practices and disposal requirements is provided in Appendix C of this SSWP Addendum.
- Used lumber treated with pentachlorophenol, creosote or other preservative treatments such as electric poles, telephone poles, and railroad ties will be disposed of at a Class 2 or Class 3 landfill licensed to accept treated wood for disposal. An MSDS, if available, will be provided with the treated wood being landfilled. If a landfill cannot be located to accept the used treated lumber, it will be profiled and then disposed accordingly of at a permitted Transfer Storage Disposal Facility (TSDS) or waste disposal facility.
- Non-regulated ACM such as roofing materials, floor tiles, transite panels, etc., that are intact will be disposed of as nonhazardous asbestos containing construction debris at a permitted Class 3 landfill. Regulated ACM such as friable fireproofing or transite debris will be appropriately disposed at a facility permitted to accept that waste type. A detailed plan describing appropriate building demolition practices and disposal requirements is provided in Appendix C of this SSWP Addendum.
- Metals waste such as barbed wire, concertina wire, and used pipes will be collected in a dumpster and picked up by a metal recycler.
- Soils from excavations will be returned to the excavations upon completion of the work at that site unless the soil is suspected to have been contaminated. If contamination is suspected, the excavated soil will be stored on and covered with plastic sheeting. Soil samples will be collected from the soil and will be analyzed to evaluate soil treatment or disposal options.

Hazardous IDW will be stored in either satellite accumulation points or temporary (less than 90-day) storage areas. Hazardous IDW will be manifested and transported for disposal in accordance with appropriate regulatory requirements. Hazardous IDW will be disposed only at approved Class 1 treatment, storage, and disposal facilities. Non-hazardous IDW will be stored in general storage areas. Non-hazardous IDW will be shipped to the disposal facility using bills of lading. Non-hazardous IDW will be disposed only at approved Class 2 or Class 3 facilities.

14.0 REFERENCES

1. Final Programmatic Work Plan, Former Fort Ord, Monterey, California, Ordnance and Explosives Cleanup, prepared for U.S. Army Corps of Engineers, Sacramento District, Parsons, May 2004.
2. Notice of Intent Removal Action at Sites OE-15SEA.1, OE-15SEA.2, OE¬15SEA.3, and a Portion of OE-15SEA.4, Former Fort Ord, California, prepared for U.S. Army Corps of Engineers, Sacramento District, Harding ESE, February 1, 2002.
3. Final Technical Memorandum, OE-15 (Mortar Alley), OE-15MOCO.1, OE 15SEA.1–4, OE-16, Range 30A Area, and OE-46 (York School) OE Surface Removal, Parsons, December 2001.
4. Final, OE Investigation and Removal After Action Report, Inland Range Contract, Former Fort Ord, California, Field Latrines, prepared for U.S. Army Corps of Engineers, Sacramento District, USA Environmental Inc., September 30, 2001.
5. Final After Action Report, 4' OE Removal in OE-15 (Roads and Trails), Former Fort Ord, CA, September 23, 2001.
6. Final After Action Report, 100% Grid Sampling – Site OE-15B, Former Fort Ord, CA, December 28, 2000.
7. Final After Action Report, 4' OE Removal – former Fort Ord Fuel Breaks, Former Fort Ord, CA, November 15, 2001.
8. Final After Action Report, 4' OE Removal & Investigation (HTW), Former Fort Ord, CA, September 30, 2001.
9. Final After Action Report, 100% Grid Sampling – Site OE-15 MoCo 1 & 2, DRO.02 and Seaside 1, 2, 3, 4, Former Fort Ord, CA, October 13, 2001.
10. Final Maintenance Report, Fuel Breaks, Multi-Range Area (MRA), Former Fort Ord, CA, December 27, 2001.
11. Final After Action Report, 100% Grid Sampling – Site OE-15A, Former Fort Ord, CA, December 28, 2000.
12. Final After Action Report, Del Rey Oaks Group, Former Fort Ord, CA, April 2001.
13. Draft Final Ordnance and Explosives, Remedial Investigation/Feasibility Study Work Plan, Former Fort Ord, Monterey County, California, May 2000.
14. Draft Final, Ordnance Detection and Discrimination Study, prepared for U.S. Army Corps of Engineers, Sacramento District, Parsons, December 2001.
15. Final, City of Seaside Community Safety Plan, prepared for U.S. Army Corps of Engineers, Sacramento District, Parsons, January 2002.
16. Draft Final, Ordnance and Explosives Sampling and Analysis Plan, prepared for U.S. Army Corps of Engineers, Parsons, December 2001.
17. Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, CA, U.S. Army Corps of Engineers, Sacramento District, April 1997.

18. Final Technical Information Paper, MRS-SEA.1-4, Time-Critical Removal Action and Phase I Geophysical Operations, prepared for U.S. Army Corps of Engineers, Sacramento District, Parsons, February 2006.

19. Technical Paper, No. 16 Revision 2, Methodologies for Calculating Primary Fragment Characteristics, Department of Defense Explosive Safety Board, October 2005.

20. Technical Paper No. 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, Department of Defense Explosives Safety Board December 2005.

21. Final Site-Specific Work Plan for the Ordnance and Explosives (OE) Cleanup, Final OE-15SEA.1-4 Work Plan, prepared for the U.S. Army Corps of Engineers, Sacramento District, March 2002

22. Final Addendum to Site-Specific Work Plan for the Ordnance and Explosives (OE) Cleanup, Final OE-15SEA.1-4 Work Plan for 25-Acre Eastern Portion of OE-15SEA.4, prepared for the U.S. Army Corps of Engineers, Sacramento District, March 2002.

23. Environmental Assessment (EA)/Initial Study (IS) for General Jim Moore Boulevard/ Eucalyptus Road Improvement Project, Pacific Municipal Consultants and Creegan and D'Angelo Consulting Engineers, March 2005.

24. Administrative Addendum to the General Jim Moore Boulevard/ Eucalyptus Road Improvement Project, Environmental Assessment (EA)/Initial Study (IS), Pacific Municipal Consultants, July 2, 2007.

25. Identifying and Misidentifying the Brown Recluse Spider, Dermatology Online Journal 5(2):7, http://dermatology.cdlib.org/DOJvol5num2/special/recluse.html (accessed 12/3/07), Vetter, Rick, 1999.

26. Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R), United States Fish and Wildlife Service, March 30, 1999.

27. Biological Opinion on the Closure and Reuse of Fort Ord, Monterey County, California, as it affects Monterey Spineflower Critical Habitat (1-8-01-F-70R), United States Fish and Wildlife Service, October 22, 2002.

28. Cleanup and Reuse of Former Fort Ord, Monterey County, California as it affects California Tiger Salamander and Critical Habitat for Costa Contra Goldfields (1-8-04-F-25R), United States Fish and Wildlife Service, March 14, 2005.

Guidance Documents

EP 385-1-95a	U.S. Army Corps of Engineers - Huntsville Center (CEHNC) Safety Concepts and Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations
27 CFR 55	Alcohol, Tobacco Products and Firearms
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
49 CFR 100-199	Hazardous Materials Transportation
AR 190-11	Physical Security
AR 385-10	The Army Safety Program
AR 385-16	System Safety Engineering and Management
AR 385-64	Army Regulation, Ammunition and Explosives Safety Standards
ATF P-5400.7	ATF Explosives Laws and Regulations
DA PAM 385-64	Department of the Army Pamphlet, Ammunition and Explosives Safety Standards
DOD 4145.26-M	U.S. Department of Defense, Contractors' Safety Manual for Ammunition and Explosives
DOD 6055.9-STD	DOD Ammunition and Explosives Safety Standards
EM 385-1-1	USACE Safety and Health Requirements Manual, September 1996
HNC-ED-CS-96-8	Guide Selection and Sittings of Barricades for Selected Ordnance and Explosives, September 1997
HNC-ED-CS-S-98-1	U.S. Army Engineering and Support Center, Huntsville Division, Methods for Predicting Fragmentation Characteristics of Cased Explosives, January 1998.
HNC-ED-CS-S-98-7	U.S. Army Engineering and Support Center, Huntsville Division, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, August 1998.
HNC-ED-CS-S-98-8	U.S. Army Engineering and Support Center, Huntsville Division, Miniature Open Front Barricade, November 1998.
HNC-ED-CS-S-00-3	U.S. Army Engineering and Support Center, Huntsville Division, Use of Water for Mitigation of Fragmentation and Blast Effects Due To Intentional Detonation of Munitions, September 2000.
USACE EM 1110-1-4009	Ordnance and Explosives Response, June 2007
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