

WORK PLAN
FOR THE
ORDNANCE AND EXPLOSIVES REMOVAL ACTIONS
SECTORS 2, 4 AND 5
FORMER BENICIA ARSENAL, BENICIA, CA

Prepared For:

Contracting Agency:
U.S. Army Engineering & Support Center, Huntsville, Alabama



Geographical Corps District:
US Army Corps of Engineers, Sacramento District

Contract Number: DACA87-97-D-0005

Task Order: 0019

Project Number: W31RYO-0152-68912

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July 2000



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ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienist
AEDA	ammunition, explosives and dangerous articles
ALARA	as low as reasonably achievable
ALS	Advance Life Support
AR	Army Regulations
ASP	Ammunition Supply Point
ASR	Archives Search Report
BBP	Bloodborne pathogens
BATF	Bureau of Alcohol, Tobacco and Firearms
BIP	blow(n)-in-place
CA	Contract Administrator
CADD	Computer Aided Design and Drafting
CAP	Contractor-acquired property
CEHNC	U. S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESPK	U.S. Army Corps of Engineers, Sacramento District
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COC	chain-of -command
COE	Corps of Engineers
CPR	cardiopulmonary resuscitation
CTHA	Certification of Task Hazard Assessment Form
CSHP	Corporate Safety and Health Program
CWM	Chemical Warfare Materiel
DA	Department of the Army
dBA	decibels-A weighted
DERP	Defense Environmental Restoration Program
DID	data item description
DOD	Department of Defense
DOT	Department of Transportation
EC	Emergency Coordinator



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EE/CA	Engineering Evaluation/Cost Analysis
EM	Engineering Manual
EMM	earth-moving machinery
EMT	Emergency Medical Technician
EOD	explosive ordnance disposal
EODT	EOD Technology, Inc.
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
EZ	Exclusion Zone
FAR	Federal Acquisition Regulation
FM	Factory Mutual Engineering Corporation
FUDS	Formerly Used Defense Sites
GFCI	ground fault circuit interrupter
GFE	government furnished equipment
GSI	geophysical survey instrument
GS&M	geophysical surveying and mapping
HARC	historic, archeological and cultural
HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	high explosive
HTRW	hazardous toxic and radiological waste
IAW	in accordance with
ICMs	improved conventional munitions
KO	Contracting Officer
LO/TO	Lockout/Tagout
LS&M	Location surveying and mapping
MPM	most probable munitions
MPRC	Multipurpose range complex
MSD	minimum separation distance
MSDS	Material Safety Data Sheet
MSP	Medical Surveillance Program
NAD38	North American Datum of 1983
NCP	National Contingency Plan
NGS	National Geodetic Standard



NEW	net explosive weight
NIOSH	National Institute for Occupational Safety and Health
OAO	Ordnance Accountability Officer
OD	open detonation
OE	Ordnance and Explosives
OEW	Ordnance and Explosives Waste
OERA	Ordnance and Explosive Removal Action
ORS	ordnance related scrap
OS	open storage
OSHA	Occupational Safety and Health Administration
OSHM	Occupational Safety and Health Manager
OSIC	On-Scene-Incident-Commander
OSS	On-site Safety Specialist
PM	Project Manager
PMP	Property Management Plan
PO	Purchase Order
PPE	personal protective equipment
PPS	Project Performance Standard
PR	pulse rate
QA	quality assurance
QC	quality control
QCI	QC inspection
QCM	Quality Control Manager
QCP	QC Plan
QD	quantity-distance
QP	Quality Program
RRR	Records Research Report
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHP	Site Safety Health Plan
SUV	sport utility vehicle
SUXOS	Senior UXO Supervisor
SWP	Safe Work Practices
TBD	to be determined



TEU	Technical Escort Unit
TLV	Threshold Limit Value
TO	Task Order
TSSDS	Tri-Service Spatial Data Standard
TWA	Time-weighted average
UL	Underwriters Laboratory
USACE	U. S. Army Corps of Engineers
UV	ultraviolet
UXO	unexploded ordnance
UXOT2	UXO Technician II
UXOT3	UXO Technician III
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
WDCMP	Work Data and Cost Management Plan
WP	Work Plan
WZ	work zone



CHAPTER 1: INTRODUCTION

1.1 GENERAL INFORMATION

1.1.1 Project Authorization and Background

This Work Plan (WP) describes the procedures, operational sequence, and resources EOD Technology, Inc. (EODT) will utilize to perform the ordnance and explosive removal action (OERA) at the former Benicia Arsenal in Benicia, California. Authorization for performance of this OERA is contained in Task Order 0019 of contract DACA87-97-D-0005, which was issued 19 June 2000 to EODT by the U. S. Army Engineering and Support Center, Huntsville (CEHNC).

1.1.2 General Statement of Work

The work required in the Statement of Work (SOW), presented in Appendix A, falls under the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS). Ordnance and explosives (OE) exist on this property formerly owned or controlled by the Department of Defense (DOD) and currently owned by Benicia Industries, Exxon, Pacific Bay Homes, and various individuals. The work described in the SOW will be performed in a manner that is consistent with the National Contingency Plan (NCP) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The applicable provisions of 29 CFR 1910.120 shall apply to all actions taken at this site.

1.1.3 Objective

The objective of this OERA is to safely and efficiently locate and remove conventional unexploded ordnance (UXO) from a total area of 135 acres at the former Benicia Arsenal in Benicia, California as specified in the SOW. This WP describes the methods that EODT will use to accomplish this objective and accommodates the requirements of the SOW.

1.1.4 Changes to the Work Plan

This WP was prepared after a review of archival data, study of prior investigations, discussions with CEHNC personnel, and a thorough evaluation of the site. The WP is based on the information available at the time of its preparation and may require modification if unforeseen circumstances arise during the execution of this WP. Should the WP require modification, changes will be made using the following procedures:



1. Under no circumstances will any change to the approved WP be executed without prior approval of the EODT Project Manager (PM) and CEHNC.
2. The Senior UXO Supervisor (SUXOS) will notify the EODT PM of the required changes and the rationale for the changes.
3. The EODT PM will develop the changes in conjunction with the CEHNC.
4. Changes to this WP will be provided in writing by EODT to the CEHNC Contracting Officer (KO) for approval.
5. On-site implementation of changes may be initiated prior to inclusion of the formal written changes if documented approval is provided to EODT by the CEHNC On-site Safety Specialist (OSS).
6. If the recommended modifications to the WP are related to safety or quality, unless directed otherwise by the CEHNC, the affected task(s) will be suspended until written procedures are developed by EODT and approved by the CEHNC KO.

1.2 SITE LOCATION

The former Benicia Arsenal encompasses 2,728 acres in the City of Benicia, Solano County, California. The former Benicia Arsenal is situated along Interstate Highways 680 and 780 (I-680 and I-780) approximately 25 miles east northeast of San Francisco. The former Benicia Arsenal and surrounding area consists of industrial and residential areas with undeveloped marshland along the Carquinez Strait to the south and rolling hills to the north. The project area is composed of steep rolling hills and runoff collection areas that discharge to Suisun Bay.

1.2.1 Site Description

The site in which the OERA will be performed is comprised of three areas: Sector 2, Artillery Test Area; Sector 4, Exxon Property Demolition Site; and Sector 5, Camel Barn Area.

1.2.1.1 Sector 2, Artillery Test Area

Sector 2, containing 15 acres, is situated in the north-central portion of the former Benicia Arsenal. The designated land use for this sector is "Limited Industrial/Open Space." The sector is characterized by steep terrain and scattered trees with the majority of the area being undeveloped. The sector boundaries are West Channel Road to the southeast, the fence alongside the McAllister Land Bridge to the west, the Sector 3A boundary to the north, and the top of the valley to the south. Limited evaluations of this sector did not identify UXO or ORS. Potential exists, however, for the area to contain UXO. Concern exists that projectiles up to 75mm may be encountered even though



sector 2 was apparently only used to test firing mechanisms. Kick outs from the OB/OD activities adjacent to Sector 2 (Sector 3A) may have contributed to OE contamination in sector 2. The areas to be cleared include the valley floor (approximately six acres) and valley walls. Due to the severely steep slopes, only a surface clearance will be performed on the valley walls. If OE or OE scrap found extends out to the boundary of the sector, the clearance effort may be expanded subject to direction from the Contracting officer. Subsurface clearance of valley walls may produce erosion. EODT, therefore, shall perform an erosion assessment in accordance with National Forestry Standards, and is contained in appendix K.

1.2.1.2 Sector 4, Exxon Property Demolition Site

Sector 4 has an area of 80 acres and is situated in the west-central part of the former Benicia Arsenal. The land use for this sector is designated as "Limited Industrial." The sector is characterized by steep terrain and scattered trees and is undeveloped. The sector borders on East 2nd Street to the east, residential homes to the west and south, and Rose Drive to the east. Previous evaluations of this area cited only ORS, but this sector is also suspected to contain the following types of OE: 155mm ballistic proof round (inert filled), 75mm Projectiles, 37mm Projectiles, and Grenades. In Sector 4 EODT shall locate and remove geophysical anomalies at the surface that could be UXO, OE, and/or ORS. It is anticipated that clearance actions will be concentrated in the southern portions of Sector 4. If OE or OE scrap found extends out to the boundary of the sector, the clearance effort may be expanded subject to direction from the Contracting officer. At the conclusion of the surface clearance of Sector 4, the cleared area will be geophysically mapped.

1.2.1.3 Sector 5, Camel Barn Area

Sector 5 contains 40 acres with a designated land use of "Limited Industrial." This sector is situated in the south-central portion of the former Benicia Arsenal. Sector boundaries are defined by Interstates I-680 and I-780, on the north by a fence, and open storage area (formerly known as OS 25 and OS 25A). The sector is characterized by rolling hills, grasslands, and scattered trees. The central area contains several buildings: the Camel Barn Museum, a parking lot, and surrounding structures. The presence of OE is suspected in this sector as a result of a 1922 fire and subsequent cleanup activities. This sector is suspected to contain the following types of OE: 75mm Projectiles, 37mm Projectiles, Grenades, and/or Stokes Mortars. The Contractor shall locate and remove all UXO in addition to all OE and ORS. Within the same mobilization effort and as directed by the Contracting Officer, the contractor shall perform geophysical mapping of paved areas in OS 25 (approximately 8 acres) to assess the likelihood of encountering pits, trenches, OE, or UXO under



the pavement. If OE or OE scrap found extends out to the boundary of the sector, the clearance effort may be expanded subject to direction from the Contracting officer.

1.3 SITE HISTORY

1.3.1 The former Benicia Arsenal began as the Benicia Barracks in 1849. During its existence, the former Benicia Arsenal supplied arms and serviced weaponry during the Civil War, the Spanish-American War, World Wars I and II, and the Korean Conflict. The former Benicia Arsenal manufactured targets for seacoast, field, and mobile artillery firing practice. Testing of 155mm howitzers was performed on the Arsenal using two large concrete test tunnels. In addition, the arsenal assembled powder charges and rapid-fire ammunition and filled armor-piercing projectiles with high explosives. As part of the Cold War build-up, the former Benicia Arsenal reconditioned NIKE guided missiles. Two NIKE test sites were situated in the northwest portion of the arsenal.

1.3.2. In 1964 the DOD decommissioned and closed the Benicia Arsenal. Substantial site revision has eliminated most remnants of the arsenal facilities. Construction of Interstate highway and refinery facilities led to the demolition of many underground storage bunkers used during transshipping operations conducted at the arsenal. Current owners of the former Benicia Arsenal include Benicia Industries, Inc., the City of Benicia, Exxon, Pacific Gas and Electric, Granite Management Corporation, Caltrans, and numerous individuals.

1.3.3 Granite Management Corporation began development of the former Benicia Arsenal in 1997 to the north and west of the Revetment Area (Tourtelot Property) until ordnance was encountered during excavation activities. Construction was halted, and the U.S. Army Corps of Engineers (USACE) performed additional research to determine the potential presence of OE, ordnance-related scrap (ORS), and hazardous, toxic, or radioactive waste (HTRW) within the former Benicia Arsenal. The arsenal histories in the Records Research Report (RRR), Archives Search Report (ASR), and ASR Supplement indicate that a variety of ordnance items was handled, stored, and destroyed at the former Benicia Arsenal. These ordnance items included assorted fuzes, mortars, small arms ammunition, 37mm rounds, and 75mm rounds.

1.4 SITE TOPOGRAPHY

The local topography at the former Benicia Arsenal varies from low-lying tidal flats on the east side to rolling hills and steep drainages within the central portion. The elevation at the site varies from near sea level along the strait to the 957-foot summit of the Sulphur Springs Mountains in the



northern portion of the site. The former Benicia Arsenal lies along the eastern flank of the Coast Ranges Geomorphic Province. The Sulphur Springs Mountains that begin at Benicia stretch northwest and form a ridge defining the eastern flank of the Napa Valley. The Carquinez Strait along the southern boundary of the arsenal is a submerged canyon cutting through the Coast Ranges formed by the ancestral flow of the Sacramento and San Joaquin River drainages. The strait is a narrow, deep channel cut simultaneously with the uplift and folding of the Coast Ranges.

1.5 SITE CLIMATE

The area climate is generally mild, moderated by the influence of the marine air. Daytime temperatures typically range from 55 to 80 degrees (°) Fahrenheit (F) in the summer and from 38°F to 53°F in the winter. Annual precipitation averages 16 inches. Most precipitation falls from October to April (average 15 inches). During the summer, a marine wind blows eastward through the Carquinez Strait with speeds ranging from 15 miles per hour (mph) in the morning to 25 mph in the afternoon.



CHAPTER 2: TECHNICAL MANAGEMENT PLAN

2.1 GENERAL INFORMATION

2.1.1 OE Operational Guidance and Regulations

The work conducted under this SOW will be performed in a manner consistent with CERCLA Section 104 and NCP Sections 300.120(c) and 300.400(e). Additionally, EODT will comply with relevant requirements presented in 29 CFR 1910.120 and pertinent USACE document, such as the Safety and Health Requirements Manual, EM385-1-1, and other relevant Department of the Army (DA) and DOD requirements regarding personnel, equipment, and procedures.

2.1.2 Chemical Warfare Materiel Discovery

EODT does not expect to encounter any Chemical Warfare Materiel (CWM). In the event CWM is encountered, EODT personnel shall immediately withdraw upwind from the work and notify the CEHNC Project Manager and the CEHNC Safety Office. The CEHNC Safety Office will notify Technical Escort Unit (TEU), as required. In the interim, EODT personnel will secure the site and place two UXO technicians in an upwind position with an unobstructed view of the suspect CWM. Upon arrival of TEU, EODT will assist as directed.

2.1.3 Special UXO Contingencies

If a UXO is located which cannot be identified, EODT field personnel will request pertinent 60 series publications from the CEHNC OSS. After proper identification, field personnel will follow the required procedures for disposal. *All inhabited buildings within the MSD or 1/600 will be evacuated during intrusive operations or engineering controls will be used.*

2.1.4 Summary of Technical Scope, Grid Layout and Operational Sequence

Operations at the Former Benicia Arsenal will be conducted in four phases. Phase 1 is the clearance (to depth) of Sector 5, Camel Barn Area, which consists of 32 acres. This activity is expected to last 23 work days. CEHNC has determined that cuts and fill areas will not be cleared, since any OE problem that may have existed was either removed or covered up during construction of the interstates. Additionally in Sector 5, the open storage area formerly known as OS 25 and OS 25A, a geophysical mapping of paved areas will be conducted (approximately 8 acres). This activity will be done in conjunction with the clearance of Sector 5 and is expected to last approximately 8 work days. Phase 2 is the clearance of Sector 2, Artillery Test Area. Due to the severe slopes, subsurface clearance of valley walls may produce erosion. Therefore, EODT shall locate and remove all OE



and OE-scrap along the valley floor (approximately six acres) and perform surface clearance of the remaining sloping terrain (approximately 9 acres). This activity is expected to take approximately 12 work days. Additionally, EODT shall perform an erosion assessment in accordance with National Forestry Standards given in the *Slope Stability Reference Guide for Forests in the U.S.*, report EM-7170-13 (reference 7.36 in the SOW). The method of performance for the erosion assessment is contained in Appendix K. The erosion assessment will include photographic illustration of hillsides following surface removal activities to establish baseline conditions for future erosion assessments. Phase 3 will consist of a surface clearance of Sector 4, Exxon Property Demolition Site (80 acres). This activity is expected to take approximately 18 work days. Phase 4 will consist of additional surface and subsurface clearance activities in Sector 4 and 5. It is anticipated that additional geophysical investigation will encompass 20 acres. All areas will be cleared IAW with the project performance standards in paragraph 3.5 of the SOW.

2.1.4.1 Operational Sequence

1. **Sector 5, Camel Barn Area:** This area is 32 acres in size and will consist of 140 grids. EODT will use magnetometers to clear this area IAW the performance standards in paragraph 3.5 of the SOW. Contacts per acre are expected to be 6000 with approximately 800 digs per grid. In addition, subcontractor will geophysically map OS25 and OS25A (approximately 8 acres). EODT will provide UXO avoidance support during geophysical mapping actions. No later than 36 hours after collection, EODT shall furnish each day's data to CEHNC via Internet, using FTP or other approved method, for inspection. Recommendations for removal shall be provided electronically to the Contracting Officer within 48 hours of completion of geophysical evaluations. Additional areas may be included in the geophysical investigation (i.e., if the construction fill is removed from OS-25). These areas will be investigated at the direction of the Contracting Officer. Additionally, if results of clearance activities in a sector indicate an unanticipated distribution of ordnance at a sector boundary, the Contracting Officer may direct clearance beyond the boundary.
2. **Sector 2, Artillery Test Area:** This area is 15 acres in size and will consist of 65 grids. Twenty-six grids will be cleared to depth IAW the performance standards in paragraph 3.5 of the SOW. Contacts per acre are expected to be 4000 with approximately 200 digs per grid. Additionally, the 39 remaining grids will be surface cleared. EODT will use magnetometers to clear this area. Contacts per acre are expected to be 1600 with approximately 50 non-excavated items per grid. All anomalies not investigated during the



surface clearance will be recorded on a map that will be included in the final removal report.

3. **Sector 4, Exxon Property Demolition Site:** This area is 80 acres in size and will consist of 349 grids. A magnetometer assisted surface clearance will be conducted in this area. Contacts per acre are expected to be 1600 with approximately 50 non-excavated items per grid. At the conclusion of the surface clearance of Sector 4, the cleared area will be geophysically mapped.
4. Additional surface and subsurface clearance activities in Sector 4 and 5 will be conducted at the direction of the Contracting Officer. It is anticipated that additional geophysical investigation will encompass 20 acres. All areas will be cleared IAW with the project performance standards in paragraph 3.5 of the SOW. If the result of clearance activities in a sector indicates an unanticipated distribution of ordnance at a sector boundary, EODT shall make recommendations to the Contracting Officer for extending clearance operations based on professional judgment of observed conditions.

2.1.4.2 Procedures To Determine If Investigation Of Additional Area Is Warranted

1. If the results of clearance activities in a sector indicate an unanticipated distribution of ordnance at a sector boundary, EODT shall evaluate the following conditions and make recommendations to the contracting officer for extending clearance operations:
 - a. Ordnance at locations, depths and in quantities not anticipated in sections 5.4.1.4 and 5.4.1.5
 - b. Significant erosion or disturbed soil: possibly an indicator of burial pits or trenches.
 - c. The physical site layout and/or topographical circumstances indicating possible past use, such as testing area, OB/OD or other disposal type area.
2. If additional investigation is recommended and approved, the new areas shall be:
 - a. Examined for criteria in sections 5.4.1.6 through 5.4.1.15 of the WP to ascertain various information about the area.
 - b. Divided into 100 ft x 100 ft grids per section 5.4.3 of the work plan.
 - c. Surface magnetometer swept IAW section 2.6.3.2 of this work plan and contacts excavated and identified IAW section 2.6.3.3 of the work plan.-and/or-
 - d. Geophysically investigated and recorded per sections 5.4.2, 5.4.4, 5.4.5 and 5.4.6 of the work plan.



- e. Anomalies identified on the dig sheet shall be excavated and identified IAW section 2.6.3.3 of the work plan.
- f. OE and OE scrap shall be processed IAW sections 2.6.4 and 2.6.8 of the work plan.

2.1.5 Excavations and Change of Site Conditions

In the event site conditions change due to weather, fire, etc., or the number of expected excavations estimated in paragraph 2.1.4.1 increases more than 25 percent, the SUXOS will notify the EODT PM who will notify the CEHNC PM.

2.2 PROJECT ORGANIZATION

2.2.1 Management Roles and Responsibilities

In addition to EODT, the project team consists of Mr. Robert Nore, the CEHNC PM, and Mr. Bruce Handel, the PM for the U.S. Army Corps of Engineers, Sacramento District (CESPK). Table 2-1 depicts the overall project organization and shows the key EODT personnel. All EODT personnel assigned to this project meet the CEHNC training and experience requirements for the positions to which they are assigned. In addition to the project management responsibilities presented in this chapter, additional QC and safety responsibilities have been given to specific key personnel as detailed in the WP and Site Safety Health Plan (SSHP), Chapter 6, of this WP. Resumes for key EODT personnel are presented in Appendix F.

2.2.1.1 Program Manager

Mr. William Pearse is the Program Manager for this project and is responsible for the overall implementation of this project. He will manage the EODT resources needed for site operations. Mr. Pearse has over 20 years of technical and business management experience and 10 years of management experience with U.S. Army Corps of Engineers (USACE) UXO projects.

2.2.1.2 Project Manager

Mr. Phillip R. Curry is the Project Manager for this project. He has substantial experience in the management of U.S. Army Corps of Engineers (USACE) projects with over 20 years explosive ordnance disposal (EOD) and UXO experience. As the PM for this project, Mr. Curry will have the following management responsibilities:

- Managing the funding, manpower, and equipment necessary to conduct site operations



- Acting as the point of contact for CEHNC project personnel, and communicating with the CEHNC through the CEHNC PM
- Overseeing the overall performance of all EODT individuals assigned to the project
- Reviewing the SOW and ensuring that necessary elements are addressed in project plans
- Coordinating all contract and subcontract work and controlling costs and schedules

2.2.1.3 Senior UXO Supervisor

The SUXOS will be responsible for the daily supervision of all site activities, which include the following:

- Managing the EODT on-site manpower and equipment necessary to conduct site operations
- Identifying problems and coordinating with the EODT PM to institute corrective measures
- Ensuring that all site activities are conducted according to this WP and relevant CEHNC regulations
- Conducting on-site training sessions for EODT personnel
- Acting as the lead technical consultant for all on-site OE related matters
- Interfacing with and relaying concerns to the CEHNC OSS
- Coordinating site operations and activities with local authorities and property owners on a daily basis

2.2.1.4 Occupational Safety and Health Manager

Mr. Andrew Bryson is the EODT Occupational Safety and Health Manager (OSHM). He is a board certified industrial hygienist (CIH) with over 11 years of industrial hygiene, safety, and hazardous waste experience, including over seven years experience working on projects with OE contamination. During this project, Mr. Bryson will provide occupational safety and health management duties as presented in detail in the SSHP in Chapter 6 of this WP.

2.2.1.5 UXO Safety Officers

The UXOSO will be responsible for the operational items listed below in addition to the safety and health responsibilities listed in Chapter 2 of the SSHP:

- Issuing and/or approving "Stop Work" orders for safety and health reasons
- Conducting on-site safety, health, and ordnance-related training for EODT personnel
- Identifying and evaluating any known or potential safety problems that may interfere with or interrupt site operations and endanger site personnel



- Consulting with the SUXOS on identifying and implementing any necessary safety-related corrective actions
- Coordinating with the SUXOS for the implementation of the safety requirements in the SSHP
- Ensuring that all site activities are conducted IAW this WP and relevant Federal, state, and local regulations.

2.2.1.6 UXO Quality Control Specialists

The UXO Quality Control Specialists will be responsible for ensuring that all site operations are conducted IAW recognized performance criteria and he will check all fieldwork prior to CEHNC quality assurance (QA) inspections. Chapter 11 of this WP contains a detailed listing of the quality control (QC) responsibilities in addition to the performance criteria that will be met during this project.

2.2.1.7 Quality Control Manager

Mr. Steve Voland is the Quality Control Manager (QCM) for this project. As the QCM, Mr. Voland will have the responsibility of ensuring that all site deliverables meet the requirements of the SOW and the QC Plan (QCP) presented in Chapter 11 of this WP.

2.2.2 Functional Relationships

The EODT PM will interact with and report directly to Mr. Robert Nore, the CEHNC PM, for all matters concerning management and the SOW. All contract-related issues will be reported directly to the CEHNC KO for consideration and/or approval. The EODT SUXOS will report directly to the EODT PM for all matters concerning site operations. EODT Team Leaders (UXOT3s) will report directly to the SUXOS, and the team members (UXOT2s or other field team personnel) will report directly to their respective UXOT3. Regarding safety issues, the UXOSO will have direct access to and will report functionally to the OSHM. For matters concerning quality control, the UXOQCS will have direct access to and will report functionally to the EODT QCM. The UXOSOs and UXOQCSs will report administratively to the SUXOS.

2.2.3 Composition and Management of Sweep Teams

EODT will field one SUXOS, one UXOSO, one UXOQCS, two UXOT3s and nine UXOT2s as presented in Table 2-1. This action will be taken at the direction of the KO.



TABLE 2-1: EODT ON-SITE PERSONNEL

LABOR CATEGORY	QUANTITY
SUXOS	1
UXOSO	1
UXOQCS	1
UXOT3	2
UXOT2	9
FOA	1
TOTALS	15

2.3 MOBILIZATION AND SITE PREPARATION

2.3.1 Mobilization of Manpower and Equipment

EODT will schedule the arrival of the work force in a manner designed to facilitate immediate productivity. A generic listing of the EODT on-site personnel is given in Table 2-1. All EODT personnel mobilized to the site will meet requirements for Occupational Safety and Health Administration (OSHA) hazardous waste operations training and medical surveillance requirements as specified in the SSHP.

2.3.1.1 Site-specific Training

As part of the mobilization process, EODT will perform site-specific training for all on-site personnel assigned to this project. The purpose of this training is to ensure that all on-site personnel fully understand the operational procedures and methods to be used by EODT at the former Benicia Arsenal. Individual responsibilities and safety and environmental concerns associated with operations will also be covered in the training. The SUXOS and the UXOSO will conduct the training sessions which will include the topics identified below.

1. Field equipment operation, including the safety and health precautions and field inspection and maintenance procedures that will be used.
2. Interpretation of relevant sections of this WP and SSHP as they relate to the tasks being performed.



3. Personnel awareness of potential site and operational hazards associated with site-specific tasks and operations.
4. Public relations to ensure that personnel will not make any public statements to the media without prior coordination with and approval of the CEHNC and CESPCK Public Affairs Office.
5. Environmental concerns and sensitivity including endangered/threatened species and historic, archeological, and cultural (HARC) issues.
6. Additional OSHA or CEHNC required training as required by the SSHP.
7. Identification features, hazards, and disposal methods of ordnance that may be encountered.

2.3.1.2 Equipment

All equipment will be inspected as it arrives to ensure it is in proper working order. Any equipment found damaged or defective will be repaired or returned to the point of origin, and a replacement will be secured. All instruments and equipment that requires routine maintenance and/or calibration will be checked initially upon its arrival and then checked again prior to its use each day. This system of checks ensures that the equipment is functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service. A request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service. As part of the initial equipment set-up and testing, EODT will also install and test its communication equipment that includes the following:

- Hand-held portable radios used to maintain communications between the office trailer, SUXOS, and the field teams.
- Cellular telephones (very high frequency band), acquired through a local cellular service, to be used as back up communications between the office trailer, SUXOS, and the field teams.

2.3.2 Field Office Set Up

EODT will provide a mobile office trailer and an equipment trailer to be used for storage and maintenance of all site equipment.



2.3.3 Coordination with Local Agencies

During mobilization, the SUXOS, UXOSO and UXOQCS will coordinate with local service providers and agencies to ensure the availability of resources that may be needed during the course of the project. Communication will be initiated and maintained with local organizations that include:

- The CEHNC/CESPK for confirmation of priorities and schedules and identification of changes to the SOW
- Local vendors and suppliers
- Local Benicia fire, medical, and police agencies
- EODT shall attend three public meetings during the administration of the project.

2.3.4 Optional Preliminary Activities

With the exception of site survey and grid lay out, no additional preliminary activities are anticipated.

2.4 SITE PREPARATION

Constraints applicable to site preparation are given in Chapter 12.

2.4.1 Vegetation Removal and Brush Clearing

Vegetation removal and brush trimming (to the extent necessary) will be conducted as needed on a grid-by-grid basis by OE Removal Teams, to allow for the effective use of detection technologies. UXO encountered during vegetation trimming will be marked with crossed flags and reported to the SUXOS.

2.4.2 Geophysical Test Plot

A geophysical test plot will be constructed using inert OE items or non-OE items of similar size, type, and weight that will be buried as described in paragraph 4.5 (Task 5) of the SOW. This test plot will be used for the Geophysical Investigation Prove-out and daily for response checks of the magnetometers. Earth moving machinery (EMM) will be used to establish the test plot.

2.4.3 Surface Sweeps

Sweep activities are covered in paragraphs 2.6.3.2 and 2.6.3.3 of this WP.



2.5 STATISTICAL SAMPLING

Not applicable to this project.

2.6 PROCEDURES FOR LOCATING, REPORTING AND DISPOSITION OF UXO

2.6.1 Responsibilities of OE Removal Personnel

OE removal personnel are responsible for safely locating, identifying, and recording UXO/OE discovered. Each UXO team will be supervised by a UXOT3 who will ensure compliance with all safety measures and operational requirements. Positive identification of live UXO/OE and all scrap located by a UXO team will be confirmed by the UXOT3 supervising the team.

2.6.2 Overall Safety Precautions and Practices

EODT will conduct safety and operational briefings daily. Additionally, the SUXOS, UXOSO, or UXOQCS may hold a safety stand-down to conduct training at any time a deviation or degradation of safety warrants a review. The safety and operational training and briefings listed below shall be conducted and documented as specified.

1. **Daily Tailgate Safety Briefing:** Each day, prior to the commencement of work, a tailgate safety briefing will be conducted for all site personnel by the UXOSO/QCS or SUXOS. A written record of this training will be maintained in the EODT Safety Meeting Attendance Log. The briefing will focus on specific daily hazards, potential hazards and risks that may be encountered, and the safety measures that should be used to eliminate or mitigate those hazards. These briefings will provide personnel with the known or potential task-specific hazards related to the day's operation. The Certificate of Task Hazard Assessment (CTHA) forms will be available and used during the safety briefing to inform personnel of the task-related hazards. The CTHA forms will also be used to inform personnel of the personal protective equipment (PPE) and safe work practices that will be used to mitigate the task hazards.
2. **Visitor Safety Brief:** All visitors entering the site must report to the SUXOS and sign the visitor's log. Visitors shall be given a safety briefing, as outlined in the SSHP, prior to entering any work area. Visitors shall be escorted at all times by a UXO-qualified individual. Operations will be suspended per Para 6.5.4 prior to entering the EZ.
3. **Environmental Concerns:** The promotion of environmental sensitivity will be an ongoing part of the daily safety and operational briefs.
4. **OE Refresher Training:** All UXO personnel will be given UXO refresher training by the UXOSO, SUXOS, or UXOQCS on the known ordnance to be encountered on site.



The refresher will include topics related to the ordnance that may be encountered on site, including the identification of the OE, the hazards, and the disposal methods.

5. **Additional Training:** Chapter 6 of this WP details additional on-site training.

2.6.2.1 Compliance with Plans and Procedures

All personnel will adhere strictly to approved plans and established procedures. If operational parameters change and there is a corresponding requirement to change procedures or routines, careful evaluation of such changes will be conducted by on-site supervisory personnel in close liaison with the CEHNC OSS. Any new course of action or desired change in procedures will be submitted in writing along with justification for approval. Approved written changes will be implemented in a manner that will ensure procedural uniformity and end-product quality.

2.6.2.2 General Site Practices

All operational activities at the former Benicia Arsenal will be performed under the supervision and direction of qualified UXO personnel. Non-UXO qualified personnel will be prohibited from performing any operation unless they are accompanied and supervised by a UXO technician.

Throughout the entire project, EODT personnel will adhere to the following general practices.

1. **Work Hours:** Operations will be conducted only during daylight hours. EODT intends to work four 10-hour days with an optional schedule of five 8-hour days. In no case will personnel work more than ten hours in any day or more than forty hours in any week. Additionally, a minimum 48-hour rest period will be provided before the start of the next workweek.
2. **Basic UXO Procedures and EODT Standard Operating Procedures:** During all operations with the potential for encountering UXO/OE, EODT personnel will strictly adhere to the general UXO procedures outlined in the CEHNC publication "Safety Concepts and Basic Considerations for Unexploded Ordnance (UXO) Operations," dated May 2000. This document is attached to EODT standard operating procedure (SOP) 120A presented in Appendix G of this WP.
3. **Site Access:** EODT will control access to all work areas. Access will be limited to only those personnel required to accomplish the specific operations or to those personnel who have a specific purpose and authorization to be on the site. No hazardous OE operations will be conducted when non-UXO or unauthorized personnel are inside the defined minimum separation distance (MSD) zone.
4. **Handling of OE:** Only UXO-qualified personnel will handle OE items.



5. **Visitor Safety:** All visitors entering the site will report to the EODT field office and sign the visitor's log. All site visitors shall receive a safety briefing, as outlined in the SSHP, and visitors will be escorted at all times by UXO personnel when inside a UXO/OE area.

2.6.2.3 Safety and Operational Training and Briefings

EODT will conduct safety and operational training on a daily basis starting with the morning briefing. Daily safety training will typically be conducted by the UXOSO; however, with regards to safety, EODT solicits and welcomes comments and input from all employees. The SUXOS and UXOQCS will also conduct operational training sessions and briefings. This training will address team assignments, potential problems and their respective resolutions and productivity status.

2.6.2.4 Ordnance Locators to be Used

The geophysical survey instruments (GSI) to be used on this project is the Schonstedt 52 Cx detector. EODT will use this instrument and additional instruments as necessitated by the suspected OE.

2.6.2.5 Magnetometer Response Checks

Prior to use each day, EODT personnel will first adjust their GSI IAW manufacturer's guidelines and then check the GSI response against the established geophysical test plot. This type of response check will be conducted and documented each day for each magnetometer, prior to its use in the field. If an instrument does not respond correctly and field maintenance fails to correct the problem, that instrument will be tagged as inoperable, removed from service, and replaced. Replacement equipment will be tested in the same manner as outlined above.

2.6.2.6 Site Control during OE Operations

For the purpose of this WP, an OE operation is defined as any activity conducted where personnel are excavating, investigating, inspecting, or handling any OE or explosive materials. Once an OE operation commences in an area, only those UXO-qualified personnel involved in the on-site activities will be permitted into the MSD. Prior to initiation of on-site OE operations, all nonessential personnel will be removed to a location outside the MSD, which is equal to the safe blast and fragmentation distance for the most probable munition (MPM). The MPM is the OE item with the greatest MSD based upon the blast and fragmentation distances expected to be found. In the event that an item with a larger MSD is located during on-site activities, the CEHNC will be



notified and the CEHNC-ED-CS will be contacted to calculate the new MSD. During OE operations, the MSD will also be the boundary for the exclusion zone (EZ). The MPM, MSD, and 1/600 distance for this OERA at the former Benicia Arsenal is given in Table 2-2. The calculations used to determine the MSDs for munitions exploded are located in Appendix J.

**TABLE 2-2:
FORMER BENICIA ARSENAL MPM, MSD, AND 1/600 DISTANCE**

Sector	MPM	MSD	1/600 Distance
2	75mm M48	1701 ft	234 ft
4	75mm M48	1701 ft	234 ft
5	4" Stokes mortar	1611 ft	313 ft

See Appendix J for calculation sheets and documentation of MSD and 1/600 approval.

2.6.2.6.1 Prior to commencing demolition operations, access roads to the site(s) will be blocked. The SUXOS will coordinate the blocking of any roads, if required. Avenues of ingress will not be opened without the express permission of the SUXOS-appointed Demolition Supervisor. A constant state of vigilance will be maintained to prevent intrusion into the MSD.

2.6.3 UXO Identification

The UXO identification process will start when the suspected UXO is located in the grid. The UXOT2 locating the item will, if possible, identify the item. Identification will be confirmed by the UXOT3. If the item cannot be identified, the EODT SUXOS and UXOQCS will be notified. If EODT resources cannot make a positive identification, the CEHNC OSS will be notified.

2.6.3.1 Magnetometer Assisted Surface Sweep

Sweep activities are covered in paragraphs 2.6.3.2 and 2.6.3.3 of this WP.

2.6.3.2 Subsurface Geophysical Survey

LAW the SOW, EODT UXO personnel will conduct a subsurface GSI clearance in Sectors 2 and 5 as described in the SOW. The subsurface geophysical mapping for Sector 5, open storage area formerly known as OS 25 and OS 25A, is addressed in Chapter 5 of the WP. Additionally EODT



will conduct a surface clearance in Sector 2 (steep sloping terrain) and in Sector 4. The surface/subsurface clearance will be performed using the procedures listed below.

1. **Grid Preparation:** When the team arrives at a site, the UXOT3 will inspect the area to determine what, if any, preparatory measures will be required before the GSI sweep can be conducted. The grid size has been established at 100 ft by 100 ft. The width of the search lanes will not exceed five feet.
2. **Magnetometer Sweep:** Once grid preparations have been completed, the team will establish the search lanes needed for performing the magnetometer sweeps. To ensure complete coverage of the grid during the magnetometer sweep, the grid will be temporarily divided into five-foot wide search lanes that will be delineated using a system of ropes or some other means as determined by the UXOT3 based upon grid conditions. As feasible, the search lanes in a typical grid will run parallel to the north/south grid boundaries. The removal team will use the procedures listed below to perform the magnetometer sweeps.
 - a. Once the search lanes have been established, the sweep teams will typically line up along the southern boundary of the grid, starting in the southwest corner of the grid being searched.
 - b. When all grid preparation and sweep set-up procedures have been completed, the UXOT3 will signal the sweep personnel to begin the magnetometer survey of the grid. The magnetometer sweep personnel will remain within their lane and will sweep the areas directly in front of themselves. To ensure there is no interference between magnetometer teams, there will be at least one uncleared lane between the two sweep teams, or a staggered start will be used to maintain distance and avoid interference. To ensure that each search lane is adequately swept, and that the magnetometer will be able to appropriately respond to subsurface items, both the forward movement of the sweep personnel and the swing of the magnetometers will be performed at a controlled pace. Throughout the sweep, the UXOT3 will closely monitor individual performance to ensure that these procedures are performed in an appropriate manner with due diligence and attention to detail.
 - c. As the sweep progresses, the team will use the designated sweep lanes to guide their paths and ensure complete coverage of the grid.
3. Once the sweep line reaches the boundary, the team personnel will move to the next lanes and proceed back to the other boundary.



4. When a surface item is located, the UXOT2 locating the item will either mark the item for examination when the grid sweep has been completed or the item will be investigated as it is discovered. The determination of whether to mark or inspect an item when it is found will be made by the UXOT3.
5. During surface clearance operations in Sectors 2 and 4, EODT will align five UXO personnel abreast, each with a Schonstedt magnetometer to assist the visual search. The team will not be more than five feet apart. A "hip chain" with biodegradable string will be attached to the outside member to ensure complete coverage of the area.
6. A map of Sector 2 will be provided indicating locations of anomalies not investigated during the surface clearance.
7. Should EODT encounter non-OE scrap such as old appliances in any sector these items will be moved and the areas underneath and immediately around it will be checked.

2.6.3.3 Anomaly Excavation and Identification

Excavation and identification of anomalies will be performed using the following criteria and procedures:

1. Only EODT UXO-qualified personnel will perform investigation of anomalies.
2. To gain access to a subsurface anomaly area, EODT UXO-qualified personnel will use hand tools to remove soil above the anomaly.
3. Once soil has been removed, the excavated area will be visually and magnetically surveyed to determine if any OE have been uncovered and to assess the approximate distance to the item (based upon signal strength).
4. When the excavation is believed to be within one foot of the anomaly source, additional excavation will be conducted with care.
5. Excavation will be continued until the source of the anomaly has been uncovered and identified. If excavations exceed the Project Performance Standard (PPS) in the SOW paragraph 3.5 the CEHNC OSS will be notified.
6. Prior to entry into any excavation greater than three feet deep, the UXOSO will inspect and assess the excavation.
7. The initial excavation and inspection of an anomaly will be conducted by a UXOT2. Once the first UXOT2 identifies the anomaly as OE, the item will be further inspected to determine its condition.
8. The UXOT3 will confirm the item's identity and condition and will record the item(s) identity and location. Grid location (x,y,z) will be used to record UXO/OE position.



9. The UXO item will then be marked with two-crossed flags and its identity will be recorded and reported to the UXOQCS.
10. UXO/OE ORS scrap will be collected and staged in a cleared area.
11. EODT shall find and recover all UXO, OE, and OE Scrap to the standards stated in the SOW paragraph 3.5.1 (Project Performance Standards) will be recovered and consolidated. Prior to detonation the X,Y,Z will be used to record the UXO for inclusion in the sites database.

2.6.3.4 Earth-Moving Machinery

1. When EMM is required, the UXO supervisor and SUXOS will coordinate its use and basic requirements and in turn, ensure that a cleared entrance and egress path is available. At no time will EMM excavate directly over a suspected UXO nor will it dig closer than 12 inches to the item.
2. Once heavy equipment is within 12 inches of the OE, the excavation will be completed by hand methods as described above.

2.6.4 Transportation of OE

Fuzed OE items will not be moved or transported. For those items that are not fuzed and are identified as being safe to move, the SUXOS, in conjunction with the CEHNC OSS, will determine the desirability and safety requirements associated with consolidating multiple UXO.

2.6.5 Safe Holding Area

The need for a safe holding area is not anticipated. If it is later determined that a safe holding area is required for this project, the SUXOS will coordinate with the CEHNC OSS to designate, prepare, and secure a temporary holding area.

2.6.6 Operations in Populated/Sensitive Areas

Operations in populated areas include Sector 5. Boundaries for this sector include Interstates I-680 and I-780 and the Camel Barn Museum accompanied by a parking lot and surrounding structures. Sector 2, with West Channel Road to the southeast, which has several businesses in the area. Sector 4, which borders East Second Street to the east, residential homes to the west and north, and Rose Drive to the northeast. EODT will clear all grids up to the MSD based on the MPM for each Sector. Work within the MSD will not proceed without approval from the Contracting Officer. In sector 5 grids are placed over the entire sector in the event that EODT will have to extend work beyond the



MSD. CEHNC has determined that cuts and fill areas will not be cleared, since any OE problem that may have existed was either removed or covered up during construction of the interstates. The MSD and 1/600 calculation sheets, are presented in appendix J. Quantity-distance maps are provided in appendix B.

2.6.7 Engineering Controls

Engineering Controls as delineated in *Use of Sand Bags for Mitigation of Fragmentation and Blast Effects due to Intentional Detonation of Munitions*, Document Number: HNC-ED-CS-S 98-7, dated August 1998, will be applied as necessary to comply with MSDs already in existence for OE items anticipated on this project. Tamping may be used to control noise or to mitigate the destructive power of the explosives used during planned detonations. The K328 distance is proportional to impulse noise levels and meets OSHA standards of (140db). As stated in the above-referenced publication, all sound levels at 100 feet were substantially less than 140db. Additional approved engineering controls may be used as needed for the OERA.

2.6.8 Demolition Operations

All UXO will be marked with two crossed pin flags pending disposal blow-in-place (BIP). All demolition operations will be coordinated by the SUXOS with the CEHNC OSS and will be conducted LAW the procedures outlined in TM 60A-1-1-31 and the EODT SOP for Disposal/ Demolition Operations. Demolition operations will be conducted using the engineering controls stated in paragraph 2.6.7. This procedure will limit noise to acceptable levels and reduce fragmentation distance. Table 2-3 lists the Net Explosive Weight of each munition along with the donor charge weight. Consolidating multiple UXO is not anticipated for this project, but if it is deemed necessary CEHNC's publication *Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, dated March 2000 will be used.



Table 2-3
Net Explosive Weight

Munition	Net Explosive Weight Lbs.	Donor Charge Weight 21 gram Perforator
3"/50 APHE Projectile Sector 5	.30	21 gram
75mm M48 Sectors 2, 4, 5	1.47	21 gram
37mm MkII Sectors 4, 5	0.53	21 gram
VB Rifle Grenade Sectors 5	.11	21 gram
3" Stokes Mortar Sector 5	2.1	21 gram
4" Stokes Mortar Sector 5	7.92	21 gram

Demolition operations will be performed as needed. Demolition operations shall typically be scheduled for the afternoon. Demolition operations will be conducted IAW the steps outlined below.

1. **Supervision:** Demolition operations will be performed under the direction of the demolition supervisor designated by the SUXOS. This designated UXOT3 will be charged with the responsibility of ensuring that the procedures contained in this WP and the referenced documents are followed. The UXOSO will observe the demolition procedures and monitor compliance with the requisite safety measures and, in the event of a noncompliance, the UXOSO is vested with the authority to stop or suspend operations. Disposal activities are inherently hazardous and require strict adherence to approved safety and operational procedures. IAW Chapter 6, violations of procedures will typically result in immediate removal from this project and termination of employment or a reprimand, as appropriate.
2. **Site Security and Notification:** Prior to the start of any explosive disposal activities, the SUXOS will verify that an exclusion zone has been established and that all non-essential



personnel are outside the MSD. The SUXOS will also ensure that all contacts have been informed of the impending disposal shot.

3. **Equipment:** Standard demolition equipment will be used. Procedures will follow the guidelines dictated by TM 60A-1-1-31 and this WP. EODT will utilize explosives and detonators connected to detonating cord in its shots. Multiple shots within a grid will be connected using detonating cord.
4. **Explosive, Storage, Accountability, and Transportation:** EODT does not plan on storing explosives on site. A local contractor will supply explosives as needed. Once issued EODT will maintain total control of explosives while on site IAW the company Standard Operating Procedures (SOP). Only the amount of explosives required for the day's operations will be issued. EODT will comply with the requirements listed below:
 - a. Strict accountability of explosives will be maintained at all times. EODT will maintain an explosives accountability record (Magazine Data Card), found in Appendix E of this WP, and will reconcile amounts upon receipt, withdrawal, and weekly.
 - b. Only UXO personnel will be issued explosives and allowed to transport explosive materials.
 - c. All vehicles transporting explosives will be properly inspected, equipped, and placarded prior to the loading of explosives onto the vehicle, and DD Form 626 completed.
5. **Disposal Shots:** While preparing OE for detonation, the UXOSO will ensure that the number of personnel on site is kept to the minimum required to safely accomplish the disposal mission. Authority to initiate demolition operations will rest solely with the SUXOS. The UXOSO will be responsible for ensuring all personnel have been accounted for and that the area is secure prior to authorizing the detonation of explosive charges. The SUXOS will ensure that all pertinent parties have been notified of an impending demolition shot.

2.6.8.1 Prior to priming the demolition shots, the team will perform these actions: 1) direct all personnel not involved in the priming process to evacuate the area and assemble at the designated assembly point and 2) ensure that any necessary roadblocks have been established.

2.6.8.2 Upon shot completion, the SUXOS or UXOSO, with assistance from the UXOT3 (Demolition Supervisor), will visually inspect the disposal shot. While one of these individuals performs a visual inspection of the disposal site(s), the second one 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 there are no residual hazards, the UXOSO will authorize the resumption of site operations of any teams affected by the operation and notify the SUXOS. The team will fill demolition holes as required. In the event an additional shot is required, the team will again conduct demolition operations as described above.

2.6.9 Records

The UXOT3 will maintain a detailed accounting of activities performed at each grid and will include, as a minimum, information pertaining to the following:

- Date and time operations began
- Team composition and personnel names and positions
- Date and time operations were completed
- Any event which impacted the day's operations
- Quantities of UXO along with its identification, condition, disposition and location, and estimated weight recovered by grid location

2.6.10 Quality Control

This QC Plan (QCP), as a component of the EODT Quality Program (QP), provides the procedures for controlling and measuring the quality of all work performed during site activities on the former Benicia Arsenal. All QC activities will be performed and documented IAW applicable professional and technical standards and the CEHNC requirements. This site specific QCP provides procedures for the following activities:

- Testing, response checking or calibrating equipment used to perform work tasks
- Determining the effectiveness of work performed
- Inspecting the maintenance and accuracy of site record
- Determining compliance with this plan and all other elements of the WP.

2.6.10.1 Site Quality Control

The EODT UXOQCS will ensure that sweep teams are complying with this WP and the SOW during their operations in the field. Any deviations will be resolved immediately to ensure compliance. Issues that cannot be resolved will be brought to the attention of the SUXOS/PM. The UXOQCS will observe the sweep teams in operation and ensure the grids are being swept in a manner that will to detect all UXO/OE IAW paragraph 3.5 in the SOW. If one OE item or inert OE



item resembling a UXO or UXO scrap as defined in the PPS is found, the grid will fail QC/QA audit. The UXOQCS will periodically check the magnetometers being used in the field. All QC audits will be recorded.

2.6.11 Project Close-out

This paragraph and the EPP found in Chapter 12 of this WP will be followed in the breakdown of the site. All temporary facilities will be removed and the site returned, as nearly as feasible, to its original condition. Demolition holes and excavations will be filled in as required.

2.6.11.1 Break Down Site

See paragraph 2.6.11.4.

2.6.11.2 Removal of the Workforce

EODT will demobilize site personnel as activities are completed and workforce reduction is warranted. The decision to reduce personnel will be based on operational requirements and will be submitted to CEHNC for review and approval.

2.6.11.3 Close Out of Accounts

Following the completion of operations, EODT's SUXOS will take action to close all accounts with local vendors and suppliers. Final billing for these accounts will be forwarded to the EODT Lenoir City office for payment. As part of its demobilization activities, EODT will close all accounts and terminate its cellular telephone service.

2.6.11.4 Removal of Facilities and Equipment

During demobilization, EODT will remove and return all facilities and equipment used to support this project IAW Chapter 12 of this WP. The procedures in Chapter 9 of this WP for documenting equipment transfers will be followed by the SUXOS. Equipment will be removed as specified below.

1. **EODT Equipment:** EODT will remove all of its operating equipment from the former Benicia Arsenal. The equipment, which will be in a clean and operable condition, will either be returned to the EODT corporate office in Lenoir City or shipped to another project.
2. **GFE:** The GFE, which has been utilized, will be turned-in according to guidance provided by CEHNC.



2.7 MANAGEMENT OF OE AND NON-OE SCRAP

Scrap will be classified and inspected for hazardous material in the grid by the respective teams as inert OE scrap or inert non-OE scrap. The UXOT3 will estimate the weight of the scrap. The scrap weight and type will be recorded by the UXOT3. The inert scrap will be removed from the grid(s) by the team(s) and placed in a designated area. The UXOQCS and other qualified UXO personnel designated by the SUXOS will inspect the scrap to verify that it contains no hazardous material. When the verification has been made that the scrap is free of hazardous material, the scrap will be placed in a secure container/area. All stockpiled inert ordnance and OE-related scrap will be turned into Stockton, CA DRMO (Sharp Army Depot). A DD Form 1348-1A will be utilized as the Turn-In Documentation and will include the statement: "This certifies that AEDA residue, Range Residue, and/or Explosive Contaminated Property listed, has been 100 percent properly inspected and to the best of my knowledge and belief, are inert and/or free of explosive material." The DD Form 1348-1A requires dual signatures. The SUXOS and USACE OE Safety Specialist will sign as the verifier. All certificates must clearly show the typed or printed name, organization, signature, and phone number of the persons certifying the inspection. Material that cannot be verified as specified above shall be returned to the site, detonated, and re-inspected. Inert filled ordnance will be explosively or mechanically vented to expose the inert filler prior to turn-in.

2.8 PUBLIC AFFAIRS AND COMMUNITY RELATIONS

The contractor shall not make available or publicly disclose any data generated or reviewed under this contract or any subcontract. When approached by any person or entity requesting information about the subject of this or any subcontract, the contractor shall defer to the CEHNC for response. The contractor shall incorporate a similar condition in all subcontracts, which states as follows: "The subcontractor shall not make available or publicly disclose any data generated or reviewed under this subcontract unless specifically authorized by the prime contractor. When approached by any person or entity requesting information about the subject of this subcontract, the subcontractor shall defer to the prime contractor for response."

2.9 DISSEMINATION OF DATA

Reports and data generated under this contract shall become the property of the Government and distribution to any other source by the contractor is prohibited unless authorized by the KO.



2.10 FINAL REPORT

At the conclusion of RA at the former Benicia Arsenal, EODT will submit a draft Site Specific Removal Report (SSRR) to the CEHNC for comment. Once EODT receives, reviews, and incorporates the CEHNC comments into the draft report, EODT will submit the final SSRR for approval. The final SSRR will meet the requirements of DID OT-030 Site Specific Removal Report and contain the following items:

- Detailed accounting of all UXO and OE-related materials located and destroyed
- Daily journals of all activities associated with the job site
- A recapitulation of exposure data, including the total number of man-hours worked on site, the total motor vehicle mileage, the total number of flying hours, and total number of flights
- QC documentation
- DRMO turn-in documentation
- Color photographs depicting major action items and OE discoveries and 45 minutes of narrated videotape
- A financial breakdown by task of all costs and labor hours used to perform the SOW
- Map showing areas cleared
- Map of Sector 2 indicating locations of anomalies not investigated during the surface clearance

CHAPTER 3: EXPLOSIVES MANAGEMENT PLAN*(Incorporates Explosive Siting Plan and will be utilized only if required.)***3.1 INTRODUCTION**

This plan addresses issues associated with the requisition, receipt, storage, transportation, inventory, and use of demolitions material at the former Benicia Arsenal, Benicia, California. This plan incorporates local, state, and Federal laws and regulations to include Bureau of Alcohol, Tobacco, and Firearms (BATF) Pamphlet ATF P5400-7, which is an excerpt from 27 CFR Part 55; DOD 6055.9-STD Ammunition and Explosives Safety Standards; Department of Transportation (DOT) Regulations; Army Regulations (AR) 190-11, EM 385-1-1; and EODT Policies and Procedures. A copy of the EODT BATF license will be available on-site.

3.2 ACQUISITION**3.2.1 Description and Estimated Quantity of Explosives**

EODT will utilize either boosters, jet perforators, or det cord along with electric detonators for demolition shots to control the operation and reduce the net explosive weight (NEW) to be used. EODT uses DOT Class 1.4 explosives whenever possible, which are safer to handle, easier and less expensive to ship and store and more readily available. The demolition materials anticipated for use at the former Benicia Arsenal are presented in Table 3-1.

TABLE 3-1: EXPLOSIVE DEMOLITION MATERIALS

Description	Estimated Quantity	DOT Hazard Class	Net Explosive Weight	UN NO.
Det Cord, 80 grain	1,000 ft.	1.4 D	13.9 pounds	UN0289
Shape Charge, 19 grain	50 ea.	1.4 S	1.95 pounds	UN0441
Boosters	50 ea.	1.4 D	33.3 pounds	UN0042
Electric detonators	40 ea.	1.4 B	3.3 pounds	UN0267

3.2.2 Acquisition Source

EODT will acquire demolition explosives from JRC Haliburton, Dallas, Texas, and Austin Powder Company, Suisun City, California. Each of the explosive items has been identified in the Equipment Plan presented in Chapter 9 of this WP.

3.3 INITIAL RECEIPT

3.3.1 Receipt Procedures

Initial receipt of demolition material will be conducted IAW the SOP for Explosives Acquisition, Storage, and Accountability found in Appendix H of the WP. The EODT SOP Explosives Acquisition, Storage, and Accountability lists the procedures for receipt and issue of demolition materials. Demolition materials will be issued in day boxes by Austin Powder Company, Suisun City, California as needed and returned at the end of the day. The day boxes will be returned to the deliverer of the explosives and returned to Austin Powder Company, Suisun City, California after each use.

3.3.2 Discrepancy Reconciliation Procedures

In the event there is a discrepancy during the initial receipt of explosive items, EODT will not accept the shipment and the vendor will be notified to correct the error. If the shortage affects the operation of the project, the CEHNC PM and the OSS will be notified immediately.

3.4 STORAGE

EODT will not store explosives on site. Explosives will be delivered, as needed, by Austin Powder Company, Suisun City, California. The procedures located in EODT Explosives Acquisition, Storage, and Accountability SOP will be followed for delivery of explosives.

3.4.1 Establishment of Explosive Storage Facility

N/A

3.4.2 Physical Security

Austin Powder Company, Suisun City, California will provide physical security for the explosives.



3.5 TRANSPORTATION

3.5.1 Procedures for Transporting Explosives

Transportation of explosives will be conducted IAW the EODT Explosives Transport SOP. The roads to be traveled are located within the former Benicia Arsenal boundaries and will include paved and unpaved roads. EODT personnel transporting explosives will use two BATF approved day boxes for the transport of demolition material to the grids. The first box will contain the electric detonators, and the second will contain the perforators, boosters and/or detonating cord. A predetermined route will be identified and used when transporting explosives.

3.5.2 Requirements for Explosive Transport Vehicle

The vehicle used by EODT to transport explosives will be inspected prior to use each day using the EODT vehicle checklists. The requirements for the vehicle used to transport explosives include the items listed below.

1. Vehicle engine will not be running and wheel chocks will be set when loading/unloading explosives.
2. Explosives will be transported in a covered pick-up truck whenever possible. When using an open vehicle, explosives will be covered with a flame resistant tarpaulin (except when loading/unloading).
3. The area of the vehicle where the explosives are placed for transportation will have either a plastic bed liner, dunnage, or sandbags placed in the area to protect the explosive from contact with the metal bed and fittings.
4. Explosive laden vehicles will have a first aid kit, two ten pound ABC fire extinguishers, communications capabilities, and be properly placarded.
5. Compatibility requirements will be observed.
6. Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions.

3.6 INITIAL RECEIPT AND ISSUING PROCEDURES

Initial receipt of demolition material will be conducted IAW the EODT Explosives Acquisition, Storage, and Accountability SOP, which is located in Appendix H this WP.



3.6.1 Responsibilities

3.6.1.1 Senior UXO Supervisor

The SUXOS maintains overall responsibility for projecting demolition material requirements in sufficient time for EODT to process and requisition the required materials. The SUXOS is also ultimately responsible for maintaining accountability of demolition materials and immediately reporting any losses or discrepancies to BATF, CEHNC, and EODT.

3.6.1.2 Individual Responsibilities

All EODT employees are responsible for ensuring the proper and safe handling, use and control of demolition materials. In addition, these personnel are responsible for the return and correct inventory/annotation of the magazine data cards.

3.6.2 Authorized Personnel

Only those personnel authorized by EODT are permitted to receive and issue explosives.

3.7 INVENTORY

The EODT Explosives Acquisition, Storage, and Accountability SOP lists the procedures to be followed for the inventory, notification of loss/theft, return of unused materials at the end of each day, and disposition of demolition material at the conclusion of the project.

3.7.1 Physical Inventory of Storage Facilities

N/A

3.7.2 Reconciliation of Discrepancies

In the event there is a discrepancy during the inventory, the item(s) will be recounted a minimum of two additional times. If a discrepancy exists, the EODT PM/SUXOS, the CEHNC KO (or the Contracting Officer Representative), the OSS, and the BATF will be notified.

3.7.3 Lost, Stolen, or Unauthorized Use

If it is discovered that explosive items have been lost, stolen, or used without authorization, the EODT PM, the CEHNC KO (or the Contracting Officer Representative), the OSS, and the BATF will be notified.



3.7.4 Final Disposition of Explosives

An economic analysis will be conducted and submitted to the KO for approval.

3.7.5 Forms

All forms associated with the receipt, storage, inventory, and use of demolition material will be kept in the site office.



CHAPTER 4: EXPLOSIVE SITING PLAN

4.1 EXPLOSIVE STORAGE MAGAZINES

There will be no on-site storage facility for all explosives required during the course of the project.

4.1.1 Magazine Type

N/A

4.1.2 Magazine Contents

N/A

4.1.3 Quantity Distance Criteria

N/A

4.1.4 Engineering Controls for Public Exposures

No engineering controls are needed to limit/control public exposures.

4.2 PLANNED OR ESTABLISHED DEMOLITION AREAS

There are no planned or established demolition areas for this project except for the grids where the OE items were located.

4.3 FOOT PRINT AREA

4.3.1 Blow-in-Place

Safe separation distance for all personnel during BIP operations will be the MSD for the MPM.

Separation distance data is in appendix J.

4.3.2 Collection Points

If used, the collection points shall have the same public separation distance as the MPM for the site.

For former Benicia Arsenal, the MPM and MSD are given in Table 2-2 of Chapter 2.



4.3.3 In-Grid Consolidated Shots

If in grid, consolidated shots will be performed IAW the reference *Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites* dated August 1998 (updated March 2000). The reference will be available on the site.

4.4 SITE MAP

See Appendix B for site maps.

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CHAPTER 5: GEOPHYSICAL INVESTIGATION PLAN

5.1 GEOPHYSICAL INVESTIGATION PLAN

This chapter details the geophysical investigation plan in support of OE removal action at the former Benicia Arsenal in Benicia, California. This removal action was authorized by the U.S. Army Engineering and Support Center, Huntsville (CEHNC) under contract # DACA87-97-D-0005, Task Order # 0019. This Chapter was developed in accordance with DID OT-005-05.

5.2 UXO SAFETY

A UXOT2 will conduct visual surveys for surface ordnance prior to the survey crew entering an area potentially containing UXO. A magnetometer or electromagnetic survey of each intrusive activity site will be conducted to ensure the site is anomaly free prior to the crew setting monuments or driving stakes. The UXOT2 will not be required on a full time basis for most of the project, for non-intrusive activities.

5.3 PERSONNEL QUALIFICATIONS

A well-trained, experienced two-person crew, led by a qualified geophysicist, will acquire geophysical data. All geophysical investigations will be managed by a qualified geophysicist meeting the qualification requirements listed in DID OT-025. The qualified geophysicist will have a degree in geology, geological engineering, or a closely related field and a minimum of five years of directly related geophysical experience.

5.4 GEOPHYSICAL INVESTIGATION PLAN OUTLINE

5.4.1 Site Description

5.4.1.1 Geophysical Investigation Program Objectives

The former Benicia Arsenal is located approximately 25 miles east-northeast of San Francisco. The objectives of the geophysical work are: 1) geophysical prove-out; 2) digital geophysical mapping of paved areas within OS 25 to assess the likelihood of pits, trenches, or other evidence of OE or UXO beneath the pavement; and 3) optional geophysical mapping of additional 20 acres. Additional site information pertinent to the geophysical investigations is included in the following sub-sections.

5.4.1.2 Specific Areas to be Investigated

The geophysical program is designed to utilize the optimal digital geophysical instrumentation and survey methodologies to locate unexploded ordnance in the following work areas:



1. **Test Plot.** The geophysical subcontractor will demonstrate the performance of all geophysical methods, equipment, and personnel prior to the start of geophysical mapping at a test plot established by EODT and CEHNC. The test plot dimensions will be 50 feet by 50 feet and shall include 12 inert 37mm projectiles at various depths and attitudes. The test plot shall be designed with a 5-foot wide, 50-foot long strip containing six 37mm inert projectiles at various depths and attitudes. Another 5 x 50 foot strip, with six 37mm inert projectiles at various depths and attitudes shall be located 20 feet away, parallel to the other strip and inside the 50 x 50 test plot. The 37mm inert projectiles shall be no deeper than 16 inches. No ordnance, other than those inside the two 5 x 50 strips, shall be located in the test plot. The geophysical subcontractor will perform digital geophysical mapping of the test plot, analyze the data, and report the results with exactly the same detail and procedures as planned for the project area. Geophysical investigations within the project area will not begin until the project objectives have been achieved within the test plot.
2. **Paved Areas in OS 25.** The geophysical subcontractor will collect digital geophysical data over a paved open storage area (OS 25) approximately 8 acres in size, within Sector 5 – Camel Barn Area.
3. **Additional Areas.** At the discretion of the Contracting Officer, the geophysical subcontractor will perform digital geophysical mapping of additional areas as identified. It is anticipated that the additional area will encompass approximately 20 acres.

The geophysical subcontractor will complete all of the above investigations within a single mobilization effort.

5.4.1.3 Past, Current, and Future Uses

Past uses of the site were primarily as a shipping and receiving facility for military equipment and material manufactured within CONUS and destined for military campaigns supported by the Port of San Francisco. Currently, several industries, as well as various individuals own the Arsenal. Within Sector 5, the sandstone buildings that now serve as the Camel Barn Museum were originally used as warehouses. Specifically, Sector 5 is currently designated as "limited industrial" land use. Future land use within Sector 5 is expected to remain the same.



5.4.1.4 Anticipated UXO Types

Sector 5 is suspected to contain the following types of OE: 75-mm Projectiles, 37-mm Projectiles, Grenades, and/or Stokes Mortars.

5.4.1.5 Depth Anticipated

All anomalies will be located in accordance with paragraph 3.5 (Project Performance Standards) in the SOW.

5.4.1.6 Topography

Topography within Sector 5 is typically that of rolling hills. The paved open storage area within OS 25 is assumed to be relatively level.

5.4.1.7 Vegetation

The Arsenal is primarily characterized as open grasslands. Stream courses as well as the edges of Lake Herman support willows, cottonwood trees, blackberry, and rose bushes. Portions of the former Arsenal are situated within tidal regimes and are vegetated by marsh grasses.

5.4.1.8 Geologic Conditions

The Arsenal lies at the southern end of the Sulphur Springs Mountains, which generally consist of lower Cretaceous-age (approximately 50-150 million years old) marine siltstones and sandstones overlain by Plio-Pleistocene-age (approximately 1 to 3 million-year-old) marine clays of the Merced Formation. Most of the valleys have a sequence of older alluvium overlain by younger (recent deposits) of fossil-bearing alluvial gravel. From information gathered, there is no indication of magnetic rock types within the former Arsenal that would negatively affect geophysical surveys.

5.4.1.9 Soil Conditions

In undisturbed portions of the Arsenal, soil is an organic silty clay or pale brown to dark grayish-brown clay. Soils generated from the Merced Formation are generally a light olive-brown to blue-gray, organic silty clay. Most development of the former Arsenal has occurred within the valleys, which subsequently have received varying amounts of foreign fill materials.



5.4.1.10 Shallow Groundwater Conditions

The majority of the surface runoff within the Former Benicia Arsenal boundaries is captured in a drainage channel that flows from north to south and discharges into Suisun Bay. Most other smaller drainages on the arsenal flow southeast or southwest into the main drainage channel. The low-lying area east of the Exxon refinery along Industrial Way is subject to flooding during high runoff periods.

5.4.1.11 Geophysical Conditions

There are no known conditions at the former Arsenal expected to have an adverse affect on the geophysical surveys.

5.4.1.12 Site Utilities and other Man-made Features

The majority of the arsenal is developed as an industrial park. The southern area does have mixed use with residential areas intermittent with light industrial buildings and their supporting utilities.

5.4.1.13 Site Specific Dynamic Events

There are no known site-specific dynamic events that may interfere with the geophysical surveys.

5.4.1.14 Accessibility

Paved roads are generally open to access; however, some unpaved roads are restricted by private landowners. A paved road leading to the Camel Barn Museum and surrounding points of interest easily accesses Sector 5, the Camel Barn Area.

5.4.1.15 Potential Worker Hazards

Aside from the potential to encounter UXO, there are no known unique potential worker hazards.

5.4.2 Geophysical Investigation Methods

5.4.2.1 For this investigation, a qualified two-person geophysical team will employ a single sensor, either an inductively coupled metal detector or a total field magnetometer. It is anticipated that, in open areas, a Geonics EM-61 metal detector will be used to collect data at 20cm intervals along lines spaced three feet apart. In wooded or otherwise difficult areas, a Scintrex Smartmag SM-4 cesium vapor magnetometer (or equivalent) will be used to collect

total field magnetic data at five readings per second while profiling along lines spaced three feet apart. A Scintrex Envimag proton precession magnetometer will be operated as a base-station to measure diurnal changes in the earth's magnetic field during the collection of field magnetic data. The base station instrument will remain stationary while recording continuous readings at five-second intervals. Final equipment selection will be based upon the Geophysical Prove-out results.

5.4.2.2 The Geonics EM61 metal detector is a time domain instrument that detects both ferrous and non-ferrous metal objects. A transmitter current pulse (bipolar rectangular) in a 1m x 1m transmitter coil 40cm above the ground generates a primary magnetic field in the earth, which induces eddy current in nearby metallic objects. The eddy current decay produces a secondary magnetic field that is measured by sampling induced voltages in two receiver coils (bottom coil co-planar with transmitter, and top coil 40cm higher). The measured responses are recorded in an integrated data logger. The EM61 coil dimensions and sampling times are appropriate for the expected ordnance types on site.

5.4.2.3 The Scintrex cesium vapor magnetometer is well suited for the detection of ferrous munitions. It also offers an advantage over the commonly employed EM-61 when operating in vegetated terrain, providing greater mobility. The magnetic method measures variations in the earth's magnetic field. Localized variations or distortions in the magnetic field can be identified and interpreted as subsurface ferro-magnetic objects.

A review of all data and initial editing procedures will be performed in the field using appropriate software. Corrections for diurnal drift will be applied to the magnetic data. Once satisfied with the data quality, it will then be electronically transferred to a workstation for final processing and interpretation using Geosoft® Oasis Montaj software.

5.4.3 Location Surveying, Mapping, and Navigation

Prior to the arrival of the geophysical crew, a land surveyor or EODT will establish first-order control points in State Plane Coordinates. Wooden stakes or survey pins (driven into asphalt) will be set throughout the area to be geophysically mapped on a 100-foot grid. Using the emplaced control points, the geophysical crew will establish individual grids for data collection. Highly accurate data positioning will be achieved through the use of painted ropes, placed across

the area of investigation to assist in straight-line profiling, and for the placement of fiducial marks within the data sets.

5.4.4 Instrument Standardization

Geophysical instruments used will be field tested daily to ensure that they are operating properly. If the standard response cannot be attained, the instrument will be re-calibrated, repaired, or replaced.

1. The function of each geophysical instrument will be checked according to the manufacturer's specifications upon daily inspection by the survey teams.
2. Each digital geophysical instrument will be used to measure and record at least one standard calibration test line over known inert OE items each morning prior to use. Peak anomaly readings over the OE items within 10% of the known values will be considered to indicate that the instrument is functioning correctly.
3. Each digital geophysical instrument will be used to measure and record at least one standard calibration test line over known inert OE items at the end of each day and at any other time at the discretion of the instrument operator to assess instrument functionality.

5.4.5 Data Processing, Correction, and Analysis

Initial evaluation of digital geophysical data will be performed using Geonics® and Scintrex® software for downloading, viewing of profiles lines, location correction based on fiducial markers, and exporting of field data to an (x,y,z) format for contouring and processing. The primary geophysical data processing and interpretation software will be the Geosoft® data processing software with the UX-Detect extension. Geophysical data processing will include the following procedures:

1. Conversion of local grid coordinates to State Plane coordinates
2. Diurnal Drift Correction
3. Heading corrections
4. Lag corrections
5. Normalization or leveling (removal of background)
6. Gridding of data
7. Digital filtering and enhancement
8. Calculating the 3D analytic signal from the magnetic data
9. Gridding of analytic signal

10. Selection of anomaly picks (above an appropriate thresh-hold) will be approved by CESPK and CEHNC's geophysicist.
11. Anomaly depth calculation
12. Preparation of geophysical maps and target maps

5.4.6 Quantitative Interpretation and Dig Sheet Development

Geophysical anomalies (or targets) will be identified from the processed data. For each grid, the geophysical subcontractor will assess each of the following factors prior to selecting anomalies (or targets):

1. The local background (terrain noise) conditions
2. An evaluation of data completeness and accuracy
3. An assessment of data quality based on the survey and grid QC data
4. The grid boundary conditions, utilities and/or other cultural features present, and unsurveyable areas (trees, buildings, etc.)
5. A delineation of the extent and boundaries of pits and trenches (Anomaly lists will not be generated for landfill areas. These areas will be delineated on a site map)

5.4.6.1 Dig Sheets

The geophysical contractor will, using a qualified geophysicist, analyze the geophysical data for each OE removal grid, identify anomalies that may represent buried UXO, and prepare anomaly lists containing the following information:

1. Project site
2. Geophysical contractor
3. Responsible geophysicist
4. Grid identification
5. Grid corner locations in UTM coordinates
6. Unique anomaly identification numbers
7. Predicted anomaly easting & northing in State Plane coordinates
8. Instrument peak value at each anomaly location

The dig-sheets will be prioritized and anomalies deemed more likely to be UXO will be ranked higher than anomalies less likely to be UXO. The criteria for selecting and locating anomalies for the anomaly (or target) list include the following items:

1. The maximum amplitude of the response with respect to local background conditions
2. The lateral extent (width) of the response
3. The 3-dimensional shape of the response



4. The location of the response with respect to the edge of the grid, unsurveyable areas, land features, cultural features, or utilities within or adjacent to the grid
5. The shape and amplitude of the response with respect to the response of known targets buried in the geophysical prove-out test plot
6. The shape and amplitude of the response with respect to relevant anomalies encountered in previous OE removal grids
7. The apparent depth of the anomaly
8. Potential distortions in the response due to interference from nearby cultural features; any instrument or grid survey QC that could affect the analysis.

5.4.6.2 Grid Maps

The geophysical subcontractor will also provide, with each dig sheet, a grid map, which contains the following:

1. Grid identification
2. Grid corner locations in State Plane coordinates
3. Contoured data
4. Anomaly locations with unique identification numbers

5.4.7 Anomaly Re-acquisition

5.4.7.1 Field Reacquisition

Anomalies will be re-acquired by using tape measures pulled from corner stakes to reacquire the interpreted x,y coordinate locations listed on the dig sheet. Each reacquired target location will be marked with a pin flag labeled with the anomaly's identifying number as specified on the dig sheet. Using hand held geophysical instruments, the reacquisition crew will then refine the location of the anomaly. The pin flag will be moved to the refined location and the coordinates documented. The new location will be marked with high visibility spray paint. Documentation will also be made of any anomalies listed on the dig sheet that cannot be reacquired.

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

Following excavation of each anomaly, the contractor will annotate on the dig sheets the results of anomaly investigation (i.e. scrap/ordnance type, actual location, and condition). The dig sheets will be returned to the geophysicist for review.



5.4.9 Quality Control (QC)

All QC processes and procedures conducted during the geophysical investigations will be fully documented, kept on site, and made available to the contractor and the government upon request. The QC documentation will also be included in the final reporting. While site-specific requirements may dictate site-specific processes and procedures, the following will be adhered to in all investigations:

1. All personnel conducting specific quality control tasks will have the appropriate training, and understand their responsibilities. Additionally these personnel will have the authority to stop work, and the organizational freedom to identify, evaluate, initiate, recommend or provide solutions, and approve corrective actions to ensure all work complies with stipulated contractual requirements.
2. In order to assure proper positioning and data integrity (repeatability), 4% of all lines surveyed in a grid will be repeated. If any significant discrepancies exist in the positioning or repeatability of the data, the problem will be identified and corrected. Following the corrective action, the grid will be resurveyed. In addition, all data will be carefully evaluated by a trained geophysicist for any potential problems (abnormal data spikes or inconsistent background values). All problems will be documented and resolved.
3. The test plot established for the initial geophysical prove-out will be utilized each day of data collection by each geophysical instrument involved. One line within the test plot, containing seeded ordnance items, will be selected as a daily QC test line. A profile of data will be collected over this test line prior to data collection each day. The same line will also be surveyed following completion of the day's surveying activities. The purpose of this exercise is to ensure repeatability, positioning accuracy, instrument drift and functionality. The geophysical profiles will be examined and compared to data collected previously in the test plot. Should any significant deviations or problems in the geophysical data be recognized, the problem will be identified and rectified prior to conducting the survey.
4. Several QC procedures will be conducted during the data processing to ensure data integrity and to minimize false positives. All raw data will be carefully evaluated for potential problems by a trained geophysicist. Appropriate lag and heading corrections will be applied. If necessary, electromagnetic data will be normalized (leveled) to a background value of zero. Gridding methodology and line spacing will correctly match the field data density. The gridded data will be evaluated for any potential problems,

such as misinterpolations between gridlines or at grid boundaries. Targets selected by Geosoft's® automatic picking algorithms will be carefully evaluated. Targets that clearly do not represent a potential UXO will be removed. Additionally, any potential UXO target not picked by Geosoft® will be evaluated and manually picked.

5.4.10 Corrective Measures

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

5.4.10.1 Positioning (Location)

In the event that the reacquisition team is unable to reacquire an anomaly in a geophysically mapped grid, the following steps will be applied:

1. Place (or replace) a pin flag at the interpreted location.
2. Recalculate and re-measure the interpreted location (watch for transposition of numbers).
3. Re-evaluate the location using the geophysical instrument and reacquisition techniques described in paragraph 5.4.7.1 "Field Reacquisition."
4. If the anomaly still cannot be located, record such on the dig sheet and return to the geophysicist for review.

If more than 5% of dig flags in a grid do not reveal an anomaly source, then work on the grid will be suspended and the dig sheet and map will be returned to the geophysicist for review (e.g., wrong grid identification, reprocessing of data, data spikes, re-evaluation of picks, etc.). Once the grid has been reevaluated, a new dig sheet and map will be generated by the geophysicist and forwarded to the reacquisition team.

5.4.10.2 Acceptance Criteria

More than one grid failure for QC/QA acceptance criteria will result in review by the subcontractor's geophysicist in consultation with the CEHNC geophysicist for applicability of geophysical surveying and data processing methods. In order of implementation, the following corrective measures may be taken:

1. Reprocess data using different methodologies or criteria.
2. Reacquire anomalies following reprocessing.
3. The grid will be re-swept using mag and dig procedures.



4. Justify failure to detect and/or reacquire (based on DID OT-005-05, paragraph 10.4.1 and the results of the geophysical test plot).

5.4.11 Records Management

All raw data files, final processed data files, hard copies, and field notes will be maintained for the duration of the project and then turned over to EODT for transmittal to CEHNC. All files will be available to EODT and CEHNC for quality and/or control processing to assure the implemented field and data processing procedures. Submission of generated electronic data files will be within 72 hours of request.

5.4.12 Interim Reporting

The geophysical subcontractor will report status of geophysical mapping to the EODT's project manager or SUXOS in sufficient time for inclusion in the weekly progress report.

5.4.13 Final Reports and Maps, Geophysical Mapping Data

Geophysical mapping data will be provided in accordance with DID OT-005-05. As soon as practical after collection, the geophysical field data shall be provided in delineated fields as x , y , z , $v(1)$, $v(2)$, etc., for delivery to EODT and CEHNC. After completion of survey and processing activities, all final geophysical maps, dig-sheets and supporting geophysical interpretations shall be provided for delivery to EODT and CEHNC. Maps that display the geophysical anomalies with annotated, interpreted and identified physical features shall be delivered in MicroStation (.dgn) compatible format.

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CHAPTER 6: SITE SAFETY AND HEALTH PLAN

6.1 GENERAL

6.1.1 Safety and Health Program

To ensure the continued health and safety of site personnel, the general public, and the environment, the EODT Corporate Policy and Procedures Manual mandates that EODT utilize all feasible, cost-effective, hazard control techniques when there is a potential for personnel exposure to chemical, physical, or biological hazards. To ensure the implementation of this policy, EODT has developed, and successfully administers, a comprehensive, pro-active Corporate Safety and Health Program (CSHP). This program has been designed and written by EODT's full-time Occupational Safety and Health Manager (OSHM) with the support and consultation of EODT's senior UXO-qualified personnel. The EODT CSHP was developed to comply with the requirements of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) standards found in 29 CFR 1910.120 and 29 CFR 1926.65. The EODT CSHP not only meets the requisite OSHA requirements, but also meets the applicable requirements of the standards, regulations, and references listed below in paragraphs 6.1.3 and 6.1.4.

6.1.2 SSHP Scope and Objective

6.1.2.1 The SSHP Approval form for the SSHP contained in this chapter is presented in Appendix F of this WP. The signatures of the EODT PM and the EODT OSHM on the approval form indicate that the SSHP presented in this WP chapter has been approved by EODT for application to the former Benicia Arsenal OE clearance.

6.1.2.2 The SSHP presented in this WP chapter has been prepared for, and will apply to, the OE removal action being performed by EODT at the former Benicia Arsenal. The primary objective of this SSHP is to provide EODT with an effective tool for the anticipation, identification, evaluation and control of the recognizable safety and health hazards that are inherent to the OE operations being conducted under TO 0019. The secondary objective of this SSHP is to provide EODT with an effective communication medium for providing site personnel with information related to task hazards and the hazard control measures they will use to safely and efficiently perform their assigned duties. Contingency plans and emergency response procedures have been developed and are presented in this SSHP for those on-site emergencies that may reasonably occur.

6.1.2.3 The levels of PPE and the SWPs specified in this plan are based on the best available information from archival data, documents, previous site studies, anticipated site conditions, and professional experience. The PPE and SWP requirements may change due to actual on-site implementation of project tasks. Any changes or additions to this SSHP will be approved by the EODT OSHM and PM, and the CEHNC KO. All changes will be submitted in writing for approval by the CEHNC KO, and will be incorporated into the SSHP upon CEHNC approval. Changes to this SSHP may be implemented in the field prior to official approval of the written changes if approval by EODT and CEHNC personnel is documented.

6.1.2.4 Due to the inherently dangerous nature of the OE operations associated with this project, all EODT, subcontractor and CEHNC personnel involved in this project shall carefully read this document prior to participation in any on-site tasks that involve potential exposure to on-site safety or health hazards. Questions related to the information in this SSHP will be addressed to, and resolved by, the EODT UXOSO. After reading this SSHP, site personnel will complete the SSHP Review and Approval Form indicating their understanding of, and willingness to comply with, the requirements in this SSHP. All site personnel will exercise reasonable caution at all times and shall immediately report to the UXOSO any site conditions which may pose a safety or health hazard to site personnel.

6.1.3 Regulations and Guidelines

Following all applicable requirements and regulations listed in the following publications will ensure the safety and health of on-site personnel and the local community:

- Occupational Safety and Health Administration (OSHA) General Industry Standards, 29 Code of Federal Regulations (CFR) 1910 and Construction Standards, 29 CFR 1926
- Engineering Manual (EM) 385-1-1, Safety and Health Requirements Manual
- EODT Corporate Safety and Health Program (CSHP)
- Army Regulation 385-40 (with Supplement 1), Accident Reporting and Records
- DOD 6055.9, Ammunition and Explosives Safety Standards, July 1999.
- U.S. Environmental Protection Agency (EPA) Hazardous Waste Management, 40 CFR 260-276, latest edition
- ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Wastes (HTRW) and Ordnance and Explosives Waste (OEW)



Activities, 18 March 1994; and U.S. Department of Defense (DOD) 6055.9, Ammunition and Explosives Safety Standards.

6.1.4 References

In addition to the publications and regulations previously listed, the following documents were used as reference material in the preparation of this document:

- DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- Occupational Safety and Health Guidance for Hazardous Waste Site Activities, U.S. Department of Health and Human Services, National Institute of Occupational Safety and Health (NIOSH), October 1985
- 2000 TLVs and BEIs, American Conference of Governmental Industrial Hygienists (ACGIH), 2000

6.2 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

6.2.1 General

All personnel who may be exposed to on-site hazards are subject to, and will comply with, this SSHP. EODT staffs all projects with highly skilled and trained personnel who are intimately familiar with OE hazards and the measures needed to protect resources from the OE hazards. Ensuring site safety is a joint effort promoted by all site personnel. However, the personnel listed in paragraphs 6.2.2 through 6.2.5 have been given key safety- and health-related responsibilities and are involved with the on-site safety and health chain of command (COC), as depicted in Figure 6-1.

6.2.2 Project Manager

Mr. Phil Curry is the EODT PM for this project and is responsible for the overall management of this project. In this role, Mr. Curry will be responsible for the management of the EODT resources needed to ensure the safe implementation of site operations. Mr. Curry is a Master EOD Technician with over 20 years experience with OE project planning, execution and management. Mr. Curry has completed both the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) course for general site workers and the Supervisor training course. As the PM for this project, Mr. Curry will:

1. Report directly to the EODT Program Manager for all project matters.
2. Manage the funding, manpower, and equipment to safely conduct site operations.
3. Review this SSHP and have a thorough understanding of its requirements.

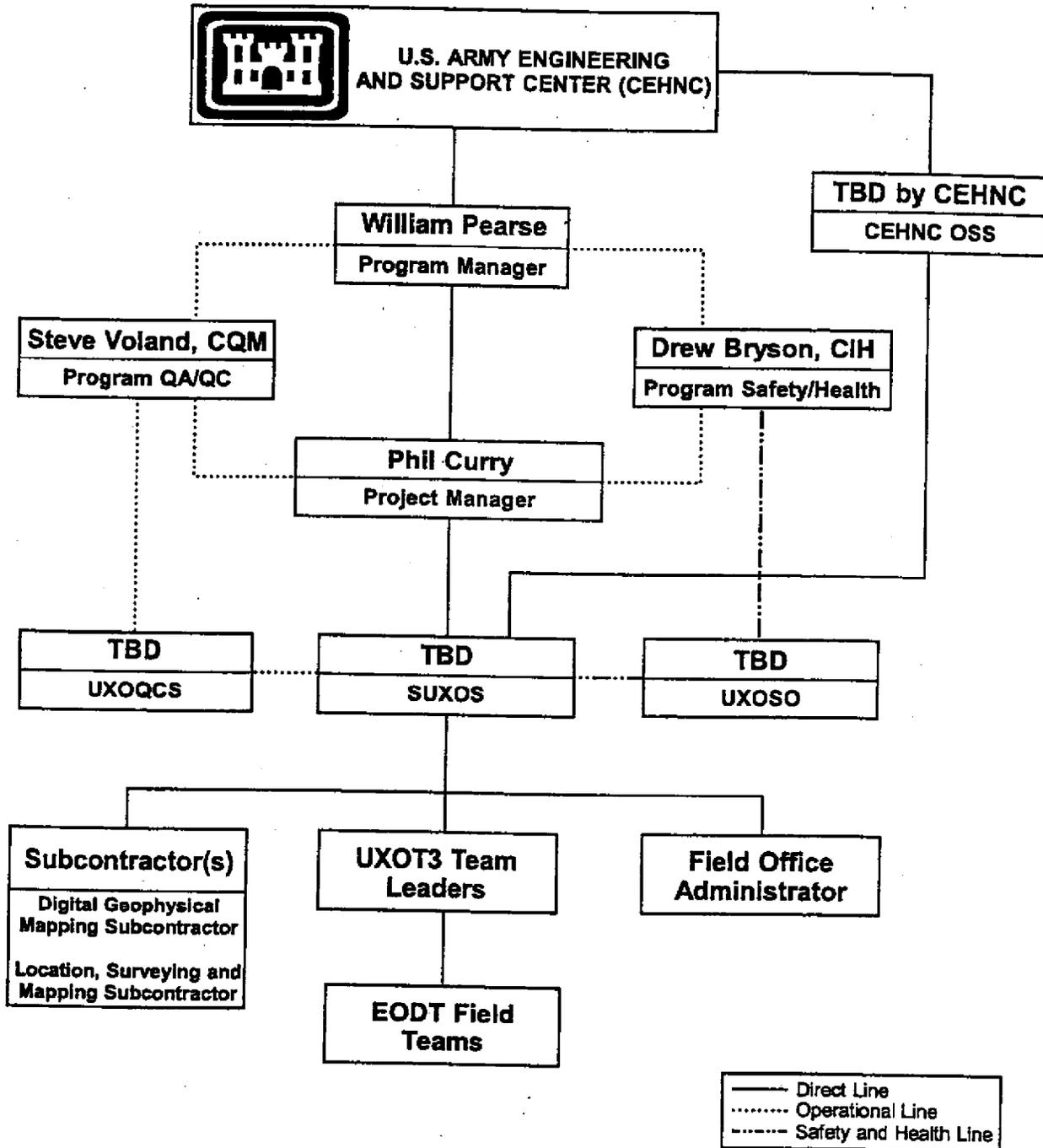


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4. Furnish copies of the WP and SSHP to site personnel for their review.
5. Coordinate with the OSHM to ensure that all anticipated project-specific safety and health issues have been addressed in this SSHP.
6. Coordinate the assignment of subcontractors and ensure that subcontractor personnel and equipment meet the requirements of the WP and SSHP.
7. Relay safety and health concerns to the CEHNC PM.
8. Coordinate with the OSHM to ensure site compliance with the SSHP and the CSHP.

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FIGURE 6-1: SAFETY AND HEALTH ORGANIZATION





6.2.3 Occupational Safety and Health Manager

Mr. Andrew Bryson, the EODT OSHM, is an American Board of Industrial Hygienists CIH with over 11-years of industrial hygiene, safety, and hazardous waste experience, including over seven years of experience with sites contaminated with OE. Mr. Bryson has completed the OSHA HAZWOPER site worker and supervisor training requirements IAW 29 CFR 1910.120. He will provide occupational safety and health technical support to the UXOSO and other project personnel. As the OSHM, he will:

1. Report directly to the EODT President regarding safety and health issues.
2. Develop, approve, and seal this SSHP.
3. Coordinate with the EODT UXOSO for field implementation of this SSHP.
4. Communicate and consult with the PM, Senior UXO Supervisor (SUXOS), and UXOSO.
5. Evaluate and authorize any changes to this SSHP.
6. Conduct, or assist in the presentation of, site-, task- and hazard-specific training.
7. Directly interface with, and relay safety and health concerns to, the CEHNC.
8. Conduct periodic site safety and health audits.
9. Ensure site and personnel compliance with the EODT CSHP.

6.2.4 Senior UXO Supervisor

The SUXOS for this project will be responsible for addressing and managing all OE and non-OE operational and safety issues. The SUXOS will have graduated from an approved EOD school, as specified in DID OT-0025, and will have over 15 years military and civilian EOD/OE experience with 10 years of that experience in supervisory positions. The SUXOS will also have completed the OSHA HAZWOPER 40-hour general site worker training and the 8-hour Supervisor/Manager training. In relation to safety and health issues, the SUXOS will:

1. Manage the on-site resources needed to safely perform site operations.
2. Fully understand the WP, this SSHP, and any other relevant documents.
3. Provide copies of the WP to project personnel for their review.
4. Review the SOW and ensure that the safety and health issues have been addressed.
5. Act as the lead technical consultant for all on-site OE-related safety matters.
6. Schedule and present the operational portion of the daily tailgate safety briefing;
7. Enforce compliance with this SSHP and the WP.
8. Directly interface with, and relaying safety concerns to, the CEHNC OSS.

6.2.5 UXO Safety Officer

The UXOSO for this project will be responsible for the on-site implementation of the safety and health requirements presented in this SSHP. The UXOSO will have graduated from an approved EOD school, as specified in DID OT-0025, and will have over 10 years military and civilian EOD/OE experience. This individual will also have completed the OSHA 40-hour HAZWOPER site worker training and the 8-hour Supervisor/Manager training requirements IAW 29 CFR 1910.120. As required by CEHNC DID OT-0025, the UXOSO will have received specific safety and health training and possess the specific knowledge and experience needed to implement this SSHP and other applicable Federal, state, and local safety and health regulation. To ensure on-site safety and health, the UXOSO will:

1. Initiate and authorize a "Stop Work" order for any imminent safety or health concerns.
2. Implement and enforce the requirements outlined in this SSHP.
3. Conduct the safety portion of the daily tailgate briefings.
4. Conduct and document site training related to site-specific hazards.
5. Specify proper levels of PPE IAW the requirements of this SSHP.
6. Implement and enforce the EODT Alcohol/Drug Abuse Policy.
7. Investigate injuries, illnesses, accidents, incidents, and near misses.
8. Conduct visitor orientation, daily safety inspections, and weekly safety audits.
9. Ensure field implementation of the EODT CSHP.

6.2.6 General Site Personnel

Even though specific EODT personnel have been given distinct responsibilities for site safety, ensuring the safe and healthful conduct of site operations is the responsibility of all personnel assigned to the site. Therefore, all project personnel involved in site activities will:

1. Comply with this SSHP and all other required safety and health guidelines.
2. Take all necessary precautions to prevent injury to themselves and fellow site personnel.
3. Identify any potentially harmful situation and immediately informing the UXOSO.
4. Perform only those tasks that they can do safely and for which they have received appropriate training.
5. Notify the UXOSO of any special medical conditions (i.e., allergies, contact lenses, diabetes) or medications, which could affect their ability to safely perform site operations.
6. Prevent the spillage and splashing of environmentally hazardous materials.
7. Practice good housekeeping by keeping the work area neat, clean, and orderly.
8. Immediately report all injuries, no matter how minor, to the UXOSO.



9. Maintain equipment in working order and report defects to the UXOSO.
10. Properly inspect and use the PPE required by the SSHP or the UXOSO.

6.2.7 Subcontractors

Any subcontractor operating on site shall be responsible for providing site personnel who have read, understand, and will comply with this SSHP. The subcontractor must provide documentation that the personnel assigned to the project have the training and medical surveillance required by this SSHP. The subcontractor shall also be responsible for providing equipment that is in good repair, safe for operations, and free from any obvious hazards.

6.3 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

6.3.1 Site Location

The former Benicia Arsenal encompasses 2,728 acres in the City of Benicia, Solano County, California. The former Benicia Arsenal is situated along Interstate Highways 680 and 780 (I-680 and I-780) approximately 25 miles east northeast of San Francisco. The former Benicia Arsenal and surrounding area consists of industrial and residential areas with undeveloped marshland along the Carquinez Strait to the south and rolling hills to the north. The project area is composed of steep rolling hills and runoff collection areas that discharge to Suisun Bay.

6.3.2 Site Description

The site in which the OERA will be performed is comprised of three areas: Sector 2, Artillery Test Area; Sector 4, Exxon Property Demolition Site; and Sector 5, Camel Barn Area.

6.3.2.1 Sector 2, Artillery Test Area

Sector 2, containing 15 acres, is situated in the north-central portion of the former Benicia Arsenal. The designated land use for this sector is "Limited Industrial/Open Space." The sector is characterized by steep terrain and scattered trees with the majority of the area being undeveloped. The sector boundaries are West Channel Road to the southeast, the fence alongside the McAllister Land Bridge to the west, the Sector 3A boundary to the north, and the top of the valley to the south. Limited evaluations of this sector did not identify UXO or ORS. Potential exists, however, for the area to contain UXO. Concern exists that projectiles up to 75mm may be encountered even though Sector 2 was apparently only used to test firing mechanisms. The areas to be cleared include the valley floor (approximately six acres) and valley walls. Due to the severely steep slopes, only a surface clearance will be performed on the valley walls. Subsurface clearance of valley walls may



produce erosion. EODT, therefore, shall perform an erosion assessment in accordance with National Forestry Standards.

6.3.2.2 Sector 4, Exxon Property Demolition Site

Sector 4 has an area of 80 acres and is situated in the west-central part of the former Benicia Arsenal. The sector is characterized by steep terrain and scattered trees and is undeveloped. The sector borders on East 2nd Street to the east, residential homes to the west and north, and Rose Drive to the northeast. Previous evaluations of this area cited only ORS, but this sector is also suspected to contain the following types of OE: 155mm ballistic proof round (inert filled), 75mm Projectiles, 37mm Projectiles, and Grenades. In Sector 4, EODT shall locate and remove geophysical anomalies at the surface that could be UXO, OE, and/or ORS. It is anticipated that clearance actions will be concentrated in the southern portions of Sector 4.

6.3.2.3 Sector 5, Camel Barn Area

Sector 5 contains 40 acres with a designated land use of "Limited Industrial." This sector is situated in the south-central portion of the former Benicia Arsenal. Sector boundaries are defined by Interstates I-680 and I-780, on the north by a fence, and open storage area (formerly known as OS 25 and OS 25A). The sector is characterized by rolling hills, grasslands, and scattered trees. The central area contains several buildings: the Camel Barn Museum, a parking lot, and surrounding structures. The presence of OE is suspected in this sector as a result of a 1922 fire and subsequent cleanup activities. This sector is suspected to contain the following types of OE: 75mm Projectiles, 37mm Projectiles, Grenades, and/or Stokes Mortars. The Contractor shall locate and remove all UXO in addition to all OE and ORS. Within the same mobilization effort and as directed by the Contracting Officer, the contractor shall perform geophysical mapping of paved areas in OS 25 (approximately 8 acres) to assess the likelihood of encountering pits, trenches, OE, or UXO under the pavement.

6.3.3 Site History

6.3.3.1 The former Benicia Arsenal began as the Benicia Barracks in 1849. During its existence, the former Benicia Arsenal supplied arms and serviced weaponry during the Civil War, the Spanish-American War, World Wars I and II, and the Korean Conflict. The former Benicia Arsenal manufactured targets for seacoast, field, and mobile artillery firing practice. Testing of 155mm howitzers was performed on the Arsenal using two large concrete test tunnels. In addition, the arsenal assembled powder charges and rapid-fire ammunition and filled armor-piercing projectiles

with high explosives. As part of the Cold War build-up, the former Benicia Arsenal reconditioned NIKE guided missiles. Two NIKE test sites were situated in the northwest portion of the arsenal.

6.3.3.2 In 1964 the DOD decommissioned and closed the Benicia Arsenal. Substantial site revision has eliminated most remnants of the arsenal facilities. Construction of Interstate highway and refinery facilities led to the demolition of many underground storage bunkers used during trans-shipment operations conducted at the arsenal. Current owners of the former Benicia Arsenal include Benicia Industries, Inc., the City of Benicia, Exxon, Pacific Gas and Electric, Granite Management Corporation, Caltrans, and numerous individuals.

6.3.3.3 Granite Management Corporation began development of the former Benicia Arsenal in 1997 to the north and west of the Revetment Area (Tourtelot Property) until ordnance was encountered during excavation activities. Construction was halted, and the U.S. Army Corps of Engineers (USACE) performed additional research to determine the potential presence of OE, ordnance-related scrap (ORS), and hazardous, toxic, or radioactive waste (HTRW) within the former Benicia Arsenal. The arsenal histories in the Records Research Report (RRR), Archives Search Report (ASR), and ASR Supplement indicate that a variety of ordnance items was handled, stored, and destroyed at the former Benicia Arsenal. These ordnance items included assorted fuzes, mortars, small arms ammunition, 37mm rounds, and 75mm rounds.

6.3.4 Site Topography

The local topography at the former Benicia Arsenal varies from low-lying tidal flats on the east side to rolling hills and steep drainages within the central portion. The elevation at the site varies from near sea level along the strait to the 957-foot summit of the Sulphur Springs Mountains in the northern portion of the site. The former Benicia Arsenal lies along the eastern flank of the Coast Ranges Geomorphic Province. The Sulphur Springs Mountains that begin at Benicia stretch northwest and form a ridge defining the eastern flank of the Napa Valley. The Carquinez Strait along the southern boundary of the arsenal is a submerged canyon cutting through the Coast Ranges formed by the ancestral flow of the Sacramento and San Joaquin River drainages. The strait is a narrow, deep channel cut simultaneously with the uplift and folding of the Coast Ranges.

6.3.5 Site Climate

The area climate is generally mild, moderated by the influence of the marine air. Daytime temperatures typically range from 55 to 80 degrees (°) Fahrenheit (F) in the summer and from 38°F

to 53°F in the winter. Annual precipitation averages 16 inches. Most precipitation falls from October to April (average 15 inches). During the summer, a marine wind blows eastward through the Carquinez Strait with speeds ranging from 15 miles per hour (mph) in the morning to 25 mph in the afternoon.

6.3.6 Current Land Usage

Sectors 2, 4, and 5 are not currently being used for any specific purpose. Sector 2 is planned for "Limited Industrial/Open Space, and Sectors 4 and 5 are planned for "Limited Industrial" use.

6.3.7 Summary of Safety and Health Hazards

6.3.7.1 In March 1994, two separate ASRs were prepared by the U.S. Army Corps of Engineers, St. Louis District. The first report, known as the *Archives Search Report Findings, Benicia Arsenal, Benicia, Solano County, California*, details site history, description, and characterization of the immediate surrounding area, real estate ownership information, findings of the site inspection, and evaluation of potential OEW (Ordnance and Explosives Waste) and CWM contamination.

6.3.7.2 The second report, known as the *Archives Search Report Conclusions and Recommendations, Benicia Arsenal, Benicia, Solano County, California*, compiles information obtained through historical research at various archives and record-holding facilities, interviews with persons associated with the Former Benicia Arsenal, and a site inspection. The purpose of this report was to present conclusions concerning the OEW/CWM Site Analysis. In 1997, the U.S. Army Corps of Engineers, St. Louis District, prepared a supplement to the March 1994 ASR. This report provided additional data to the original ASR prepared in March 1994.

6.3.7.3 A Records Research Report (Jacobs Engineering, 1999) was prepared that document the arsenal's 115 years of military activity and 35 years of post-closure nonmilitary activity. The report is an accumulation of facts from many sources and includes the history of each building, utility, and activity in order for decisions to be made concerning the potential for long-term environmental damage to soil, surface water, groundwater, and air quality caused by military activities.

6.3.7.4 The only report of previous DOD clearance activities at the arsenal is associated with the Demolition Area (see Figure 2-2). The ASR Supplement indicated that this area was cleared in 1955. However, during a later inspection of the area in 1955, several OE items were found, and it was recommended that a clearance be performed in the area. No record of a possible second



clearance was found during the ASR investigation. The only other report of DOD clearance activities is associated with the cleanup of the OE encountered during the construction of OS 25 and 25A.

6.3.7.5 During the first few months of 1999, EE/CA field investigations were conducted at the former Benicia Arsenal. The first phase of the EE/CA involved performing a geophysical investigation to detect and map metallic objects that could be OE scrap or OE. The second phase of the field investigation involved subsurface sampling. During the EE/CA field investigation, 17 OE were recovered from two of the five sectors where subsurface sampling was performed. Two of the OE were recovered from Sector 3B (Demolition Area), and 15 OE were recovered from Sector 5 (Camel Barn Area).

6.3.8 Summary of Hazardous Substances

As defined by the Federal EPA, hazardous substances are those products and materials that can threaten human health and/or environmental well being if released into the environment. Some soils of the site (i.e., the former target zones) may possibly contain elevated (above background) levels of heavy metals and explosives in the soil. However, EODT's professional experiences with sites of this nature have shown that while the metals or explosives contamination may exist in the soils at levels greater than environmental regulatory limits, there is no personnel exposure hazard involved with the hazardous substances during OE removal activities.

As a function of site operations, some site personnel will be required to use products containing hazardous materials. The hazardous materials that may be used to support site operations include: gasoline, diesel fuel, two-stroke engine oil; demolition materials, including perforators, green stick, detonator cord, time fuze, and spray paints. It is anticipated that personnel exposure to the hazardous materials will be minimal due to the limited quantities that will be used at any one time and the ventilation provided by using the materials in an outdoor setting. Material Safety Data Sheets (MSDSs) for the hazardous substance-containing products that will be used on site are presented in Appendix I of this WP.

6.4 HAZARD ANALYSIS AND RISK ASSESSMENT

6.4.1 Complete Description of On-site Work to be Performed

6.4.1.1 The on-site tasks to be performed by EODT personnel for this project will include those tasks necessary to successfully meet the requirements of the SOW. To ensure that site personnel are



fully informed of the hazards associated with each on-site task, descriptions of each primary task and discussions of the hazards associated with the task are presented below in this Chapter. Additionally, CTHA forms for each task, sub-task or group of similar tasks are presented in Appendix G of the WP. For each task hazard listed, site personnel will utilize the procedures and Safe Work Practices (SWPs) outlined in paragraph 6.14 of this SSHP to control or eliminate the hazards.

6.4.1.2 Preliminary field operations for the former Benicia Arsenal OERA are expected to start in October 2000 and are expected to continue for approximately 14 weeks. This project, as presented in the SOW, will involve clearing approximately 135 acres within the three sectors described in paragraph 6.3.2. During the performance of this project, EODT personnel will conduct the on-site tasks outlined in the SOW and Chapter 2 of this WP. The general SOW tasks that will be performed during this project and the hazards associated with the tasks are outlined below.

6.4.2 Location Surveying and Mapping (SOW Task 3)

All location surveying and mapping (LS&M) will be conducted IAW the requirements of the SOW and the procedures outlined in Chapter 5 of this WP. This task may also require the use of hand and power tools to conduct vegetation clearing. The task hazards that may be encountered during this task include:

- Cold stress
- Hazardous plants or animals
- Surface and subsurface OE
- Inclement weather
- Hand and power tools
- Physical exertion
- Material handling and lifting
- Slips, trips, and falls.

6.4.3 Vegetation Removal and Restoration (SOW Task 4)

To conduct this OERA, EODT personnel will be required to perform some level of vegetation removal. All vegetation will be removed IAW this SSHP and the procedures outlined in Chapters 2 and 12 of the WP. Vegetation removal will involve the use of chain saws and fuel-powered brush cutters. The task hazards that may be encountered during this task include:



- Cold stress
- Hazardous plants or animals
- Surface and subsurface OE
- Inclement weather
- Hand and power tools
- Physical exertion
- Material handling and lifting
- Slips, trips, and falls.

6.4.4 Geophysical Investigation Prove-out (SOW Task 5)

To ensure the proper selection and use of GSI, EODT will create a geophysical test plot that is 50 feet by 50 feet where approximately 12 inert OE items of the type and at the depths anticipated will be buried. This test plot will be used not only to select the appropriate instruments, but will also ensure the proper performance of the GSI and location techniques used on the project. The hazards that may be encountered during this task include:

- Cold stress
- Hazardous plants or animals
- Inclement weather
- Hand and power tools
- Physical exertion
- Material handling and lifting
- Slips, trips, and falls.

6.4.5 Geophysical Surveying and Mapping (SOW Task 6)

EODT personnel will conduct geophysical surveying and mapping (GS&M) of approximately eight paved acres in Sector 5, with the potential for more acreage if directed by the CEHNC KO (optional Task 12 of the SOW). This task will include the use of hand tools and GS&M equipment, and the walking of surveying lanes in paved areas, with minimal travel on unpaved, vegetated areas. The task hazards that may be encountered include:

- Cold stress
- Hazardous plants and animals (vegetated areas)
- Surface and Subsurface OE (unpaved areas only)
- Inclement weather



- Hand tools
- Physical exertion
- Material handling and lifting
- Slips, trips, and falls.

6.4.6 Anomaly Reacquisition (SOW Task 7)

EODT personnel will use precision surveying methods to reacquire the anomalies identified on the GS&M dig sheets. This will involve the use of GSI and positioning equipment to locate the actual location of an anomaly versus the location specified on the dig sheet. EODT personnel will mark both the suspect and actual locations of the anomalies. The anomalies located during this task will be excavated based upon recommendations by EODT to CEHNC. If approved, the anomalies acquired during this task will be excavated during the Task 8 Clearance Action. The hazards that may be encountered during this task include:

- Cold stress
- Inclement weather
- Hand tools
- Physical exertion
- Material handling and lifting
- Slips, trips, and falls.

6.4.7 Perform OE Clearance Action

6.4.7.1 EODT UXO personnel will conduct an OE clearance action within Sectors 2, 4, and 5 as specified in the SOW and Chapter 2 of this WP. Surface clearances will be magnetometer assisted and will be conducted on the sloped walls (approximately 9-acres) of Sector 2 and on the 80-acres within Sector 4. Subsurface clearances will be conducted using magnetometers and will include the approximate six-acre of the valley floor within Sector 2 and 38-acres in Sector 5. The surface and subsurface clearances will include all UXO, OE and OE-scrap having a diameter greater than 37mm. The subsurface clearances will be conducted to depth, with the maximum depth dependent upon the detection characteristics of the anticipated OE items, as specified in paragraph 3.5 of the SOW. To perform the OERA, EODT will divide each Sector into grids, survey the grids, and investigate all anomalies using the procedures listed in Chapter 2 of the WP. Task-specific procedures related to the conduct of the sweep are discussed in detail within Chapter 2 of the WP.



6.4.7.2 EODT UXO-qualified personnel will investigate subsurface anomalies and surface items suspected of being hazardous OE/UXO. Access to subsurface or partially buried items will be conducted using hand tools. The procedures outlined for this task are presented in Chapter 2 of the WP and paragraph 6.14.18 of this SSHP. Any item identified as potential OE will be excavated and inspected to the extent needed to confirm the identity and hazard level associated with the item. All OE investigations will be conducted by a minimum of two UXO-qualified technicians, with the first technician being the one who initially identifies the item and the second technician providing confirmation. OE items requiring demolition will be assessed further to determine if they can be safely moved. Those items that are unfuzed and positively identified as being safe to move will be uniquely marked for collection and consolidation for weekly demolition. Those items that are fuzed, or otherwise too hazardous to move, will be marked with two crossed pin flags and disposed of within 24-48 hours using BIP procedures. Demolition operations will be conducted under the supervision of the UXOT3 in charge of the demolition team, and all teams will be under the direct supervision of the SUXOS or the UXOSO, both of which have the authority to immediately suspend operations if unsafe acts or conditions exist.

6.4.7.3 To protect unauthorized personnel, as well as site personnel, an exclusion zone (EZ) equal to the MSD for a particular site will be established prior to initiating activities where an unintentional detonation may occur. Further detail related to the MSD is included in Site Control, presented in paragraph 6.9.2.3. The hazards that may be encountered by site personnel during OE removal operations include:

- Cold stress
- Hazardous UXO
- Hazardous plants or animals
- Sharp objects
- Lifting heavy objects
- Inclement weather
- Hand tools
- High noise
- Demolition materials
- Physical exertion
- Slips, trips and falls.

6.4.8 Final Disposition of AEDA/Range Residue (SOW Task 9)

EODT personnel will collect and inspect all scrap measuring greater than 37mm. All scrap will be 100% inspected IAW the scrap inspection procedures outlined in Chapter 11 of this WP. Any buckets or other receptacle used to collect and carry scrap within the grid will not be placed on the ground within the grid unless the area where the bucket will be set has been visually inspected to ensure no OE items are located nearby and that the ground surface is stable. Care shall also be taken to load the bucket so that it will not be top-heavy in one direction. Ordnance-related scrap (ORS) will be segregated from non-ORS and all scrap shall be secured to prevent accidental comingling with scrap from other sources. All ORS will be free of explosive hazards and inert ordnance items will be vented prior to turn-in IAW CEHNC *Basic Safety Concepts and Considerations for UXO*, dated May 2000. The hazards associated with scrap turn-in include:

- Hazardous plants or animals
- Sharp objects
- Lifting heavy objects
- Heat or cold stress
- Physical exertion
- Slips, trips and falls.

6.4.9 Routes and Sources of Exposure for Chemical Hazards

In assessing the risks associated with exposure to potential on-site chemical contaminants, EODT safety and health personnel examined available sources to determine what chemical hazards may be encountered during site activities. As a result of this examination, no evidence exists indicating that any chemical materials were ever used on, or brought into, the impact areas that could cause create an exposure potential for site personnel. Therefore it can be safely assumed that the potential for personnel to receive a hazardous exposure to metals, volatile organic compounds, or explosives is non-existent. If site activities change or site conditions indicate the presence of hazardous chemicals, the potential for chemical exposure and the levels of PPE will be reevaluated by the OSHM.

6.4.10 Action Levels

No chemical exposure action levels are required for this project. Action levels for the monitoring of other hazards are presented in paragraph 6.8 of this Chapter.



6.5 TRAINING

6.5.1 General Information

All personnel assigned to, or regularly entering the project site, shall receive the training required by this Chapter prior to participation in assigned site activities which pose a potential for exposure to safety or health hazards. Site personnel shall also receive the training outlined in this Chapter as applicable to their assigned duties. All personnel involved in OE investigation, handling, transportation, or disposal operations shall meet one of the prerequisites listed below:

1. Graduate of the Naval Explosive Ordnance School, Indian Head, Maryland
2. Graduate of the U.S. Army Bomb Disposal School, Aberdeen Proving Grounds, Maryland
3. Graduate of the EOD Assistant's Course, Redstone Arsenal, Alabama, with a minimum of five years of military EOD and/or commercial OE experience
4. Graduate of the EOD Assistant's Course, Eglin Air Force Base, Florida, with a minimum of five years of military EOD and/or commercial OE experience

6.5.2 CFR 1910.120 Training Requirements

6.5.2.1 40-Hour general site worker training

All EODT and subcontractor personnel with the potential for exposure to hazardous substances or other safety and health hazards must obtain 40-hours of off-site HAZWOPER training. This training must be completed, and documentation presented, before personnel are to participate in site activities involving exposure to site hazards.

6.5.2.2 24-Hour occasional site worker training

This type of training will not be applicable to personnel participating in field activities associated with the TO 0019 SOW.

6.4.1.2.1 3-Day on-site training

All EODT on-site and subcontractor personnel shall be given a minimum of three days of actual on-site field experience under the direct supervision of a trained, experienced supervisor. This training will be used to familiarize site personnel with the site-specific organization, PPE, and emergency response procedures. The three-day on-site training is site-specific and shall be documented using the Three-day On-site Training Form. The UXOSO will generate and maintain this form and will ensure that all personnel receive this training and sign the form.



6.5.2.4 8-Hour refresher training

All EODT and subcontractor personnel, to include management/supervisory personnel, shall receive a minimum of eight-hours of refresher training annually. This training will cover relevant topics from the 40-hour HAZWOPER and the eight-hour management/supervisor courses, as well as critiques of any incidents that have occurred in the past year and any other related topics.

6.5.2.5 Supervisor training

Managers and other personnel who are directly responsible for the performance of hazardous waste operations, or who directly supervise on-site personnel, shall have eight additional hours of specialized supervisory training as specified in 29 CFR 1910.120(e).

6.5.3 Site-specific and Hazard Information Training

6.5.3.1 Site-specific Information Training

Site-specific Information Training shall be used to provide site personnel with important information related to site operations. This training shall apply to the three-day on-site training requirements outlined in section 6.5.2.3 of this Chapter, and cover site-specific training topics listed below:

1. Site history and background
2. Site organization and COC
3. Proper use, maintenance and cleaning of required PPE
4. Emergency response procedures, assignments, and contacts

6.5.3.2 Hazard-specific Information Training

Hazard information training shall be presented utilizing the EODT Hazard Information Program that meets the requirements specified in 29 CFR 1910.120 (i) and the training required by EM 385-1-1. This training shall be presented to all personnel involved in site operations and shall be used to inform personnel as to the degree, nature, and level of exposure likely to occur as a result of participation in site activities. This training, as a minimum, will cover the following topics:

1. A complete description of physical and toxicological properties of any hazardous materials expected to be found on site
2. A complete description of the physical hazards associated with site operations, including those hazards listed for the site tasks as outlined in paragraph 6.4 of this SSHP
3. A description of the biological hazards which may be encountered on site, to include identification and protective methods, and what to do if exposure occurs



4. The SWPs or other hazard control techniques that will be used to minimize exposure

6.5.4 Visitor Training

Site visitors are defined as persons who: (1) are not employed at the project site; (2) do not routinely enter restricted work areas; and (3) spend short periods at the site (i.e., 1 to 2 days per visit). Site visitors may include client personnel, EODT personnel, commercial vendors, auditors or inspectors from Federal, state, or local regulatory agencies, or political representatives. It is the responsibility of all site personnel to, whenever possible, maintain a watch for visitors approaching the site and to immediately notify the SUXOS or UXOSO of the presence of the visitor. Visitors shall be required to comply with the general requirements listed in paragraph 6.5.4.1 and shall meet the appropriate requirements as specified in paragraphs 6.5.4.2 and 6.5.4.3 according to which area of the site they will be visiting.

6.5.4.1 General Requirements for All Site Visitors

Regardless of the purpose of the site visit or the control zones to be entered, the following requirements shall apply to all site visitors prior to their entry into the site:

1. The EODT SUXOS and UXOSO shall be notified of the nature and duration of the visit
2. Visitors shall sign the Visitor Log and shall record their names, date of visit, and the name of the company or agency represented
3. Site visitors shall be escorted by an EODT representative at all times while in the area
4. Visitors shall comply with the applicable safety and health requirements described below

6.5.4.2 Visitors Remaining Outside the EZ

Visitors wishing to observe site activities from outside the EZ shall receive general hazard information training, which incorporates the following topics:

1. Location and description of potential hazards and risks
2. A short briefing about the chemical hazards found on site
3. Areas of the site that are closed to visitors
4. The site evacuation plan and emergency procedures
5. Other topics as deemed appropriate

6.5.4.3 Visitors Entering the EZ

Only UXO-qualified personnel will be allowed inside the EZ. UXO-qualified site visitors requesting entry into the EZ shall be subject to the same site-specific and hazard information



training as specified in section 6.5.3 of this Chapter. This training shall be conducted prior to the visitor entering the EZ. Visitors requesting entry to an EZ shall also be required to present documentation of OSHA hazardous waste training and medical surveillance, consistent with the requirements for the general site employees. When a visitor enters the EZ, all OE-related operations shall cease, unless the visitor is UXO-qualified.

6.5.5 OE Recognition Training

All non-UXO-qualified personnel who will be involved in on-site operations will be given OE Recognition Training. This training will be used to familiarize non-UXO-qualified personnel with the appearance and components associated with the ordnance that may be found on site. This training will include EODT's "No Touch" policy, which states that non-UXO-qualified personnel will not touch any ordnance-related items unless they have been inspected by UXO-qualified personnel and deemed to be ORS or inert ordnance.

6.5.6 OE Refresher Training

All UXO-qualified site personnel shall receive site-specific OE training that covers the ordnance items that are known, or expected, to be on site. The topics to be covered in the OE refresher training shall include: type of ordnance, fuzing, fillers, hazards, and handling and disposal procedures.

6.5.7 First Aid and Cardiopulmonary Resuscitation Training

At least two full-time EODT site employees shall be trained and certified in first aid and cardiopulmonary resuscitation (CPR). Whenever possible, the UXOSO will be one of the two site personnel. The training shall be equivalent to that provided by the American Red Cross. Once trained, these employees will be tasked with the responsibility of initial first aid response to injured employees whenever other medical support personnel are not immediately available on site.

6.5.8 Bloodborne Pathogen Training

The EODT first aid-trained personnel will primarily be responsible for rendering aid in the event of an injury or accident. The first aid/CPR trained personnel who have a potential for occupational exposure to blood or other potentially infectious body fluids shall receive training as outlined in the 29 CFR 1910.1030(g)(2) and EM 385-1-1 and the EODT Bloodborne Pathogens (BBP) Exposure Control Plan. Whenever feasible, all on-site EODT personnel will receive the same level of BBP training as specified above.



6.5.9 PPE Training

A detailed discussion related to the training required prior to personnel using PPE is presented in paragraph 6.6.5 of this SSHP. This material has been placed there since the Data Item Description OT-0005-06 specifically designated that PPE training be included in the PPE section of the SSHP.

6.5.10 Hazard Communication Training

In order to comply with the requirements of the OSHA Hazard Communication (HAZCOM) Standard, 29 CFR 1910.1200, HAZCOM training shall be provided for all site personnel who will use products containing hazardous substances. This training shall be provided upon initial assignment to the site and prior to use of the product. Supplemental HAZCOM training shall be scheduled and presented whenever a new hazardous substance is introduced into the work area or an employee changes job locations where new products are encountered. All HAZCOM training shall comply with the specifications outlined in 29 CFR 1910.1200(h).

6.5.11 Fire Extinguisher Training

All EODT site personnel will be trained in the general principles of fire extinguisher selection and use, and the hazards associated with incipient-stage fire fighting (i.e., fighting a fire that has just begun). This training will be provided initially and annually thereafter.

6.5.12 Control of Hazardous Energy (Lockout/tagout)

All site personnel involved in the use of lockout/tagout (LO/TO) devices for the control of hazardous energy will receive on-site training in the proper implementation of the LO/TO Program. All training shall comply with 29 CFR 1910.147 and Section 12 of EM 385-1-1.

6.5.12.1 Training of Affected Personnel

Each person working in an area where LO/TO procedures must be implemented shall be instructed in the purpose and use of the LO/TO procedure, and the prohibitions related to attempts to restart or re-energize equipment or machinery which are locked or tagged out.

6.5.12.2 Lockout Training for Authorized LO/TO Personnel

Each person who will be authorized to conduct LO/TO procedures shall receive training in the following areas prior to using this procedure:

1. The function and purpose of this SOP



2. Recognition of hazardous energy sources
3. Types and magnitude of the hazardous energy which may be encountered on site
4. The means necessary for energy isolation and control
5. Hands-on training with locks and tags prior to implementing LO/TO activities
6. Procedures for affixing tags and a discussion related to the limitations of tags

6.5.12.3 Tagout Training for Authorized Employees

In the event that only tagout procedures and techniques are used on site, authorized personnel shall be trained in the following limitations of tags:

1. Tags are essentially warning devices affixed to energy-isolating devices and do not provide the physical restraint on those devices that is provided by a lock.
2. When a tag is attached to an energy-isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.
3. Tags must be legible and understandable by all authorized and affected personnel whose work operations are, or may be, in the area.
4. Tags must be securely attached to energy-isolating devices so that they cannot be inadvertently or accidentally detached during use.
5. The importance of using tags that are made of material that will withstand the environmental conditions encountered on site.

6.5.12.4 Employee Retraining

Retraining of authorized and affected personnel shall be conducted at least annually to reestablish employee proficiency and to introduce new or revised control methods and procedures. Retraining will also be conducted whenever periodic inspections reveal inadequacies in the authorized person's knowledge or use of the LO/TO SOP. Also, retraining may be necessary due to changes in job assignments, equipment, machinery, or processes that introduce a new hazard.

6.5.13 Daily Tailgate Safety Meetings

Prior to commencing operations each day, all EODT, contractor, and subcontractor personnel shall be given a safety briefing by the UXOSO. This briefing shall identify the anticipated site activities and the potential hazards that could be encountered and review the following: weather conditions and weather-related hazards; use of safety equipment; emergency notification, evacuation and medical procedures; accident prevention; and relevant WP/SSHP topics. Records of all Tailgate



Safety Meetings documenting date, attendance, and topics covered shall be maintained. The Tailgate Safety Meetings will also be used for the presentation of information related to lessons learned, near misses or other relevant safety topics.

6.5.14 Weekly Safety Training

At the start of each work period, normally Monday, a site-specific safety topic will be selected and discussed in detail by either the UXOSO or a speaker selected by the UXOSO. All site personnel are required to attend the training, and the UXOSO shall document this training on the EODT Documentation of Training Form. The training will consist of site-specific hazards such as the physical hazards, PPE, ordnance, temperature extremes, etc. This training will be conducted in conjunction with the tailgate safety briefing.

6.5.15 Additionally Required OSHA Training

Additional OSHA-required training as deemed necessary by the OSHM or UXOSO shall be provided as needed. Such training may include training related to specific chemical contaminants (such as lead, arsenic, etc.) or task-specific hazards such as confined space, heavy equipment, hand-tool operation, specialized PPE, etc.

6.5.16 Documentation of OSHA Training

All on-site and management/supervisory personnel shall present documentation or certification of training completion prior to participating in site activities. Without appropriate documentation, personnel shall be prohibited from entering hazardous areas or engaging in hazardous site activities.

6.6 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

6.6.1 Use of Engineering Controls

According to OSHA 1910.120(g), 1910.132, and 1910.134, whenever occupational exposures to chemical or physical hazards exist at levels in excess of established action levels, the primary objective will be to prevent the exposure hazard. This shall be accomplished as far as is feasible through the application of accepted engineering controls. However, whenever feasible engineering controls are not available, a reasonable combination of safe work practices and PPE will be used to reduce and maintain exposure below accepted exposure limits. For site operations at the former Benicia Arsenal, the wide spread application of engineering controls to control exposures is not feasible, with the exception of blade guards on brush cutters and other machinery guards installed on equipment or tools by the manufacturer. Guards of this nature will be removed only for the



purposes of conducting equipment maintenance and will be replaced prior to operation of the equipment or machinery.

6.6.2 Regulatory General Requirements and Special Considerations

All personnel performing operations on site shall be required to use the appropriate level of PPE, as specified in the CTHA forms found in Appendix G of this WP. This SSHP makes provisions for use of Level D and Modified Level D PPE according to the hazards associated with the SOW tasks. The PPE levels presented in this Chapter will be reassessed and the EODT OSHM contacted if any of the following occur:

1. Appearance of previously unidentified chemicals or conditions
2. Significant changes in ambient weather conditions, which impact the use of assigned PPE
3. Introduction of new task or expansion of a previously assigned/evaluated task
4. Discovery and confirmation of CWM

For project tasks assigned after the approval of this SSHP, the EODT OSHM, in conjunction with the UXOSO, will assess the task hazards, assign the appropriate PPE level, complete a CTHA form, and forward it to the CEHNC KO. Upon approval, the new form will be incorporated as an attachment of this SSHP.

6.6.3 Special Considerations

The following special considerations shall be observed in the selection and use of PPE for the levels discussed below.

1. Hard hats are required only when working around heavy equipment or when an overhead or head impact hazards exist.
2. Steel toe/shank boots are not required during surface/subsurface location of anomalies unless a serious toe hazard exists, whereupon a fiber safety toe will be used.
3. Safety glasses will be required only when an eye hazard exists, for example when around flying dirt/debris, using hand tools, etc. The safety glasses selected will provide protection from impact hazards, and, if necessary, ultraviolet (UV) radiation (i.e., sunlight).
4. Personnel using or dispensing products that contain materials that present a skin contact hazard will wear chemical-resistant gloves as defined in the CTHA forms.



6.6.4 Hazard-specific and Task-specific PPE Selection

6.6.4.1 Task-specific PPE assignments

Table 6-1 presents a listing of the anticipated site tasks, sub-tasks and the initial level of PPE that will be worn during the performance of each task. Modifications to Table 6-1 may be required and levels of PPE may be upgraded or downgraded according to the results of on-site monitoring discussed in paragraph 6.8 of this SSHP. Revisions to this table will only be made upon approval of the EODT OSHM.

TABLE 6-1: TASK-SPECIFIC PPE ASSIGNMENTS

Task to be performed	Level of PPE
Mobilization and site set-up / Demobilization and site closure	D
Task 3: Perform Location Surveying and Mapping	D
TASK 4: VEGETATION REMOVAL AND RESTORATION	MODIFIED
	LEVEL D
Task 5: Geophysical Investigation Prove-out	D
Task 6: Geophysical Investigations	D
Task 7: Anomaly Reacquisition	D
Task 8: Perform Clearance Action	D
Magnetometer Surveys	D
Investigation of Anomalies	D
OE Disposal Operations	D
Vehicle Operation and Maintenance	D
Task 9: Final Disposition of AEDA / Range Residue	D

6.6.4.2 Level D PPE

The PPE listed below will be the initial PPE worn during all site activities. The Level D PPE to be used will consist of the following:

1. Work clothes or coveralls (cotton)
2. Leather work gloves (as needed to protect hands from cuts and abrasions)
3. Work boots
4. Safety glasses (as required for eye protection from impact and UV hazards)



5. Ear plugs or muffs (as required by the CTHA forms for protection against high noise hazards).

6.6.4.3 Modified Level D PPE

The following PPE will be worn for those tasks requiring Modified Level D PPE:

1. Same as Level "D", but with the following additions
2. Hard-hat with face shield (wire or nylon mesh)
3. Leather anti-vibration, full-finger work gloves
4. Steel-toed boots or steel toe-caps (for chain saw operations only)
5. Kevlar chaps (only required for chain saw operations) or plastic snake leggings (for brush cutter use)
6. Ear muffs in conjunction with earplugs.

6.6.5 PPE Training

As specified by 29 CFR 1910.132, all site personnel who are required to use PPE shall be given training in the use, care, and limitations of the PPE they are to use. Prior to PPE use, the effected personnel shall demonstrate an understanding of the training and their ability to properly use the assigned PPE. Upon completion of this training, EODT will verify the training through the issuance of a certificate that identifies the name of the person trained, the training date(s), and the subject of the certification. Affected personnel will be retrained if the level or type of PPE being used changes. PPE training shall address the following topics:

1. PPE selection decisions and when and what PPE is needed
2. How to properly don, doff, adjust, and wear PPE
3. The limitations of specific pieces/types of PPE
4. The proper care, maintenance, limitations, and disposal of PPE.

6.6.6 Action Levels for Up/down Grading

Action levels for PPE up or down grading are presented with the monitoring criteria presented in Table 6-2.

6.6.7 PPE Inspection, Maintenance and Storage

Site personnel using PPE will keep the equipment clean and in good working condition. EODT shall establish and maintain a PPE storage area where field personnel may store their PPE during non-use times. All site personnel will be responsible for daily inspections of their PPE to ensure



that it is maintained in safe working order. PPE that is worn-out or defective will be brought to the attention of the UXOSO and replaced as needed.

6.6.8 Emergency Response Equipment

For this project, no additional or special levels of PPE are being specified for emergency situations. For all site operations, first aid supplies that have been approved by the consulting physician at Concentra Medical will be available on site. Each field team will have and maintain first aid supplies consisting of:

- A first aid kit meeting OSHA requirements for the team size
- Portable eye wash bottles for use during transportation to the 15 minute eye wash station
- Burn bandages
- Trauma bandages
- A fire blanket

Each team will have a fire extinguisher in the site vehicle and additional fire extinguishers will be used for any temporary fuel storage areas established. The emergency eye wash station that complies with ANSI Z-358.1 will be available in the equipment storage trailer located at the site perimeter. No safety showers will be required since there is no potential for personnel being drenched with hazardous substances that can pose a threat to the skin. Additional information related to fire extinguisher types and sizes and spill response equipment that must be available is presented in Table 6-4 and paragraph 6.11.8 of this SSHP.

6.7 MEDICAL SURVEILLANCE

6.7.1 Purpose and Scope

EODT has established a comprehensive Medical Surveillance Program (MSP) designed to assist in the prevention, diagnosis, and treatment of occupational illnesses and injuries sustained during operations on hazardous waste sites. The medical surveillance requirements outlined in this section are based upon the requirements of the EODT MSP. The medical surveillance requirements of this section shall apply to all site personnel with exposure potential to significant safety and health hazards.

6.7.2 General Requirements

Medical examinations of personnel as required by the MSP shall be conducted by, or under the supervision of, a licensed physician, who is board-certified in occupational medicine or has had



extensive experience in the recognition, evaluation, and treatment of occupational diseases. The EODT MSP is managed by the OSHM with administrative consultation from the following:

Dr. Donald W. Casey
Concentra Medical Services
123 W. Tennessee, Suite 401
Oak Ridge, Tennessee 37830
(865) 481-0991

If, due to logistical restrictions, it is not feasible for the above-mentioned physician to conduct the physical examinations required by this section, the OSHM may locate and designate an alternate physician to conduct the health assessments. The alternate physician must meet requisite OSHA qualification requirements. The alternate physician shall be responsible for performing examinations equivalent to those outlined in the MSP and shall be provided the information required in section 6.7.4.1.

6.7.3 Physicians Statement

Upon completion of a health assessment, the physician shall provide the results of the examination to the employee, and a written physician's statement shall be provided to EODT. The physician's statement shall, as a minimum, include the following: 1) the employee's name and social security number; 2) the physician's opinion regarding any conditions which would place the employee at an increased risk as a result of participation in site activities; 3) a statement indicating if the employee is qualified to wear a respirator; 4) a statement that the employee is qualified to participate HTRW-related site activities; 5) the physician's recommended limitations upon the employee's assigned work, if any; 6) any supplemental or follow-up examinations or tests which the physician believes are required to complete the assessment; and 7) a statement that the employee has been informed by the physician of the results of the examination and any conditions which may require further examination.

6.7.4 Medical Surveillance Examinations

6.7.4.1 Pre-assignment Health Assessment

The pre-assignment health assessment shall be conducted prior to personnel participation in site activities involving potential exposure to chemical or physical hazards. The pre-assignment health assessment shall have been conducted within the past 12 months and will, as a minimum, include the following elements and medical tests:

1. A complete medical and occupational history



2. A complete physical examination
3. Laboratory studies, including complete blood count with differential, and liver and kidney function tests
4. Urinalysis
5. Chemistry panel
6. PPE evaluation and pulmonary function testing
7. Audiometric and vision testing
8. Chest X-ray
9. Electrocardiogram (as determined by the physician)
10. Drug screening

6.7.4.2 Supplemental Examination

Any site worker who has been injured, received a health impairment, developed signs or symptoms from possible overexposure, or received an overexposure without the use of respiratory protection, shall undergo a supplemental examination. The physician will determine the contents of this examination and shall certify the employee's fitness to return to work prior to reassignment. The physician shall specify in writing any work restrictions required.

6.7.4.3 Follow-up Health Assessments

The physician will notify EODT, and the employee, if a work-related condition is detected during an examination that requires additional testing or assessment. The physician will also inform EODT and the employee of the nature of the follow-up health assessment. Upon conclusion of the follow-up health assessment, a statement regarding the employee's fitness for work will be provided.

6.7.5 Health Care Administrative Services

In support of the EODT MSP, Concentra Medical Services has been designated for the establishment and maintenance of any medical records related to this project and the EODT MSP. These records will be treated as private and confidential information. Additionally, employee medical records will contain sufficient information to identify the employee, support the diagnosis, justify the treatment, and document an additional follow-up case or referral.



6.7.6 Emergency and Non-emergency Medical Treatment

Prompt and effective non-emergency and emergency medical treatment will be provided for site personnel who require medical attention resulting from injuries or illnesses occurring during site operations. The treatment requirements of this section are not designed to provide for the diagnosis or treatment of non-occupational injuries or illnesses, unless immediate medical attention is needed to prevent loss of life, relieve suffering, or preclude permanent injury which would result if treatment were delayed.

6.7.6.1 Treatment of Minor Injuries

For minor injuries, the two on-site EODT personnel with first aid/CPR training will provide the initial first aid response. If additional/advanced medical treatment is required, the UXOSO will determine if the injured person should be transported using a site vehicle or if an ambulance is required. If the UXOSO determines that a site vehicle may be used, a first aid-trained attendant will accompany the driver and injured person for the trip to the hospital designated for non-critical injuries. For this project, the hospital chosen will be Kaiser Foundation Hospital in Vallejo.

6.7.6.1.1 If ambulance service is required, the UXOSO will contact the Solano County Ambulance service or the 911 Operator to request the necessary emergency ambulance service. For injuries requiring ambulance transportation, an on-board military Emergency Medical Technician (EMT) will provide advanced life support (ALS) and other care as required by the nature of the injury.

6.7.6.2 Treatment of Serious Injuries

In the event that the UXOSO requests ALS, the EODT first aid personnel will provide initial support in an effort to stabilize the injured person while the 911 Operator and ambulance service are contacted and summoned. Once on site, the EMT personnel will not only provide ALS services, but will also determine which hospital the injured party will be transported, as well as the mode of transportation. EMT personnel may elect to use ground transportation or summon helicopter air ambulance service for transporting the injured person to the Kaiser Foundation Hospital.

6.8 ENVIRONMENTAL AND PERSONAL MONITORING PLAN

6.8.1 General

On-site monitoring will be conducted during specified site activities to evaluate potential physical hazards that may be encountered. The on-site monitoring will assist in determining the



effectiveness of control measures, the need for upgrading or downgrading PPE requirements, and the effectiveness of safe work practices. Direct-reading, real-time instruments will be used whenever possible, or required, to detect and qualify site hazards. If a reading is achieved which exceeds the action levels specified in Table 6-2, the EODT UXOSO will take the steps outlined in this Chapter or other referenced paragraphs to correct the situation or minimize the exposure.

6.8.2 Perimeter Monitoring Requirements

No perimeter monitoring will be required for this project since no site operations will be conducted which would result in the release of toxic materials in gas, vapor, or particulate form.

6.8.3 Personal Monitoring Requirements

6.8.3.1 Real-time Direct-reading Monitoring

The guidelines presented in Table 6-2 represent the initial real-time, direct-reading monitoring requirements. Monitoring frequency may be escalated or reduced based upon the results of previous monitoring or the detection of factors that indicate a potential for exposure. The monitoring equipment to be used to assess exposure hazards for this project will include:

1. Sound level meter - Used as a screening device to measure sound power emitted by a source.
2. Noise dosimeter - Used to calculate the 8-hour time-weighted average (TWA) exposure.
3. Digital ambient air thermometer - Used to assess cold stress effects IAW paragraph 6.13.5 of this SSHP.

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TABLE 6-2: SITE MONITORING SCHEDULE AND ACTION LEVELS

Hazard	Equipment	Monitoring Frequency/Location	
Cold Stress	Digital Thermometer	Every four hours once ambient temperature becomes less than 60.8 °F.	
		Action Level	Action to be Taken
		See Table 6-6 to determine when specific controls must be taken.	See Table 6-6 for appropriate controls.
Hazard	Equipment	Monitoring Frequency/Location	
Noise	Sound Level Meter	Conducted during initial operation of high noise equipment, and periodically thereafter, according to the recommendations of the EODT OSHM.	
		Action Level	Action to be Taken
		WHENEVER NOISE LEVELS IN THE HEARING ZONE EXCEED 85 DBA.	Conduct noise dosimetry as outlined below. Issue hearing protection devices to effected personnel.
	Equipment	Monitoring Frequency/Location	
	Noise Dosimeter	Whenever noise levels in the hearing zone exceed 85 dBA.	
		Action Level	Action to be Taken
Noise readings greater than 80 dBA 8-hour time-weighted average.		Report dosimeter readings to the OSHM to ensure hearing protection is adequate for the level of noise experienced.	

6.8.3.2 Integrated Breathing Zone Sampling

Integrated breathing zone sampling is not applicable to this project since site operations will not involve the potential for personnel receiving an exposure to hazardous substances.



6.8.4 Monitoring Schedule and Frequency

Exposure monitoring will focus on the potential for exposure to physical hazards (including OE) during excavation trenching and characterization sampling. Table 6-2 identifies the type of monitoring equipment to be used, the frequency at which the monitoring will be conducted, monitoring method to be employed, action level, and the action to be taken if the action level is exceeded.

6.8.5 Temperature Extreme Monitoring

Cold stress monitoring will be conducted IAW the guidelines presented in paragraphs 6.13.5. This monitoring will be conducted by, or at the direction of, the UXOSO and will be used to minimize physiological effects in the event that high temperature extremes are experienced during site operations. The guidance presented in Table 6-2 will be used by the UXOSO to determine when and what type of heat and cold stress monitoring will be conducted.

6.8.6 Noise Monitoring Procedures

High noise levels are anticipated during the operation of EMM. The noise levels will be monitored to determine if hearing protection devices will be required and to ensure that the level of hearing protection being used is adequate. At the start of potential high noise operations, sound level readings will be taken in the hearing zone of the affected personnel. Noise dosimetry will be conducted for any operation where sound level readings indicate a potential for exposures above 85 decibels as recorded in the A-weighted sound level (dBA). Table 6-2 will be consulted to determine the type, amount and frequency of noise monitoring.

6.8.7 Monitoring Equipment Calibration and Maintenance

All sampling and monitoring instrumentation used on site will be calibrated and/or response-checked IAW the manufacturer's specifications before and after use each day. If an instrument fails to calibrate or respond correctly, it will be removed from service until it can be repaired IAW manufacturer's specifications.

6.9 SITE CONTROL

6.9.1 Center of Operations

EODT intends to use, to the maximum extent possible and allowable, any available government facilities and equipment whose location logistically supports site operations. During the site visit,



EODT coordinated with local suppliers, services and agencies to coordinate acquisition of supplies and coordinate emergency services if needed. EODT will be using a local explosives supplier to provide demolition materials. These materials will be ordered daily by the SUXOS on an as-needed basis. This service will eliminate the need for an explosives magazine and storage area and increase explosive safety. EODT will establish an office at the range security complex located outside the southwest corner of the range. EODT will also establish equipment storage in this area.

6.9.2 Security Procedures

6.9.2.1 Project Site Access

Project site access will be via existing access roads. Access to all sites will be through locked gates that will prevent access by the public. The EODT SUXOS will have copies of the keys to the gate locks on-site at all times. If needed, EODT will also control access to the project site using signs, barricades, or other site-specific means approved by the CEHNC. Only the personnel directly involved in the on-site operations will be granted unlimited access to the site. All other personnel will be considered as visitors and the provisions of paragraph 6.5.4 will be implemented by the SUXOS and UXOSO. For the purpose of this plan, a work zone (WZ) is defined as any location where EODT personnel are conducting any of the site tasks associated with the SOW. Additionally, an EZ is defined as the exclusion area around a WZ where EODT is conducting UXO operations involving the investigation of anomalies or demolition of OE items. The area of the EZ will be equivalent to the 1/600 distance for the investigation of anomalies (unintentional detonations) and the MSD for demolition operations (intentional detonations).

6.9.2.2 Work Zone Access Control and Security

Unlimited entry into a WZ will be given to only those personnel who are essential to the safe and effective performance of the on-site tasks. Ensuring WZ security will be the primary duty of the SUXOS and UXOSO, but all site personnel will take an active role in detecting unauthorized access. During any anomaly investigation operations within sectors 2, 4, or 5, EODT shall establish an EZ around the site boundaries that will be equal to the 1/600 distance for the MPM, and during demolition operations, the EZ will equal the MSD for the given site. As needed, EODT will use roadblocks, sentries, and other methods of controlling unauthorized access to the EZ. The SUXOS will coordinate the closure of any roads with the CEHNC OSS. If an OE item is discovered which has a greater MSD, the procedures in Chapter 2 of the WP will be used to determine the size of the EZ.



6.9.2.3 Site Control During Demolition Operations

6.9.2.3.1 Site access control will be especially critical during demolition operations. Disposal activities are inherently hazardous and require strict adherence to approved safety and operational procedures, as well as strict adherence to site control procedures. All OE requiring demolition will be disposed of using BIP operations, and will be conducted IAW the procedures outlined in TM 60A-1-1-31 and the EODT SOP for Disposal/ Demolition Operations. Engineering Controls as delineated in *Use of Sand Bags for Mitigation of Fragmentation and Blast Effects due to Intentional Detonation of Munitions*, Document Number: HNC-ED-CS-S 98-7, dated August 1998, will be applied as necessary to comply with MSDs already in existence for OE items anticipated on this project. Demolition operations will be performed under the direction and supervision of the SUXOS and, in the event of any noncompliance, the SUXOS has the authority to stop or suspend operations.

6.9.2.3.2 Prior to priming the demolition shots, the SUXOS will ensure local fire and police departments have been notified of an impending demolition shot. The SUXOS will also direct all personnel not involved in the priming process to evacuate the area and assemble at the designated assembly point. Once this is accomplished, the SUXOS will then ensure the proper use of roadblocks and tamping material and will sound the required audible warnings.

6.9.2.3.3 Upon completion of the demolition shot, the SUXOS will visually inspect each disposal shot and site security will be maintained until the demolition operations are secured. While the SUXOS performs 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 there are no residual hazards, the SUXOS will authorize the resumption of normal site operations. All demolition shots will be coordinated with the CEHNC OSS, and no off-site disposal of OE will be conducted.

6.9.2.4 Equipment Storage and Security

During non-working periods, all project equipment used on site, to include hand tools, will be stored in a temporary storage trailer to be located near the site. No explosives storage will be needed for the site since delivery of explosives will occur only on an as needed basis.



6.9.3 Site Maps

Prior to initiation of site activities, a site map will be available which will detail the following information: site sizes and shapes; restricted areas; designated assembly points; the site access routes; demolition areas; staging areas; any other information deemed necessary by the SUXOS or UXOSO. The site map will be used by the UXOSO during site safety training and the daily tailgate safety briefings. Maps of the project site are included in Appendix B of the WP.

6.9.4 Site Communications

Effective on-site and off-site communication is an integral part of site control and will be established prior to initiation of site activities. On-site communication will be used to: coordinate site operations; maintain site control; pass along safety information, work/rest periods, and etc.; and alert site personnel to emergency situations. Off-site communication will be available to ensure effective communication with off-site management personnel and emergency response services. All site personnel will be familiar with the different methods of both on-site and off-site communication. The methods EODT will use for on- and off-site communication will include:

- On-site communications between teams and site office will consist of hand-held five-watt portable radios with a range of five to eight miles, and air horns, bullhorns, sirens or hand signals will be used as needed WZ communications.
- Off-site communications will be accomplished by telephone from the field office with cellular telephones provided to each team as a back-up to both on- and off-site communications.

6.9.5 Buddy System

An important element in controlling personnel exposure to site hazards is the implementation of buddy system procedures. These procedures ensure that no site personnel are allowed to work without another qualified worker present to provide assistance. At all times buddies should:

1. Observe their buddy for signs of exposure site hazards or stresses.
2. Observe the site area in which they are working for hazards.
3. Remain within verbal or visual contact with their buddy at all times.
4. Notify the team leader and or field office if emergency assistance is needed.

6.10 PERSONNEL/EQUIPMENT DECONTAMINATION AND HYGIENE

6.10.1 Personnel Hygiene and Decontamination

Personal hygiene and sanitation facilities will be established on site IAW 29 CFR 1910.120(n) and EM 385-1-1, Section 2, to ensure personnel maintain good personal hygiene. These facilities shall



include a personal washing area, toilet facilities, and a lunch/break area. Under field conditions where a project site is not provided with a sanitary sewer system, temporary chemical toilet facilities will be used by EODT to fulfill the sanitary toilet requirement.

6.10.1.1 Level D and Modified Level D Decontamination

No chemical decontamination procedures for the Level D and Modified Level D PPE will be needed for this project. All PPE will be maintained and cleaned IAW the requirements of paragraph 6.6.7.

6.10.1.2 Emergency Personnel Decontamination Station

Due to the lack of chemical contamination and personal protective clothing, no emergency personnel decontamination station will be needed for this project.

6.10.2 Equipment Hygiene or Decontamination

Tools and equipment used on site will be kept free of accumulations of soil and other debris and will be cleaned as such prior to removal from the EZ. Equipment used in the field, to include PPE, shall be cleaned and inspected at the end of each workday to ensure that the equipment is maintained in safe operating condition. Any equipment found to be defective would be brought to the attention of the SUXOS or UXOSO.

6.11 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

6.11.1 Introduction

Thorough pre-planning, proper design, and implementation of the required emergency response contingencies can dramatically reduce the frequency and severity of emergencies. If an emergency does occur, quick, decisive action will be required since even short delays can create or escalate life-threatening situations. To ensure rapid, effective response to a site emergency, the procedures and contingency plans outlined in this Chapter shall be implemented prior to and during the conduct of any site activities involving exposure to safety and health hazards.

6.11.2 Pre-emergency Planning

Prior to the conduct of site operations, EODT site personnel will have contacted and met with appropriate local authorities. The purpose of these meetings will be to inform local authorities of the nature of the site activities to be performed under this SSHP and the potential hazards that these activities pose to site personnel, the environment, and the public. The SUXOS and UXOSO will

confirm information from the local authorities related to the type of emergency services available, including any contact phone numbers or procedures needed to summon the services. The UXOSO will be responsible for ensuring that the telephone numbers and procedures for contacting local emergency services are posted IAW the requirements of this Chapter.

6.11.2.1 Identification of Potential Emergencies

During the development of this SSHP, great attention was given to identifying potential safety and health hazards associated with the planned site activities. These hazards were then assessed to determine nature and type of emergency they could cause. Contingency plans for responding to the potential emergencies have been developed and are included in this section. The potential emergencies that may result during the conduct of site activities are as follows:

1. Personal injury from the unintentional detonation of OE
2. Injury or illness associated with contact with physical or biological hazards
3. Fire
4. Inclement weather
5. Spill of hazardous materials.

6.11.2.2 Identification/coordination of Emergency Services

Prior to the initiation of site activities, the UXOSO will contact local emergency services to verify the availability of requisite services and to confirm the means used to summon the services. It will be the responsibility of the SUXOS to ensure that off-site communications are available at all times. Site operations shall not be conducted unless means of off-site communications are established. Off-site communication will be accomplished using telephone service to the responsible support agencies. The telephone numbers for all emergency services and contacts are presented in this plan and will be posted in the office/break area and in all site vehicles. All site personnel shall be aware of the procedures for obtaining off-site emergency services.

6.11.2.3 Initial Incident Reporting Procedures

Once an emergency has occurred, team members will sound the air horn alarm. The respective team leader will establish radio contact with the UXOSO and the SUXOS to initiate site evacuation and mobilization of EODT first aid/CPR response personnel. Once informed of the emergency, the SUXOS will ensure notification to the CEHNC OSS, and the UXOSO will ensure that all teams are cognizant of the situation and are involved in the proper response procedures. The sounding of the air horn alarm and the initial radio notification will allow for the following:

1. The notification of personnel as to the presence of an emergency.
2. The cessation of all work activity as required.
3. The reduction of noise levels in order to speed and simplify communication.
4. The initiation of emergency and/or evacuation procedures.

6.11.3 Personnel Roles, Authority and Communications

6.11.3.1 On-scene Incident Commander

In the event of an emergency, the UXOSO will assume the responsibility of the On-scene Incident Commander (OSIC). The UXOSO will be assisted by the SUXOS, and in the event that the UXOSO is unavailable or incapacitated, the SUXOS will be the alternate person to assume the role of the OSIC. The OSIC will have the responsibility of directing all on-site and off-site emergency response personnel and shall advise the CEHNC OSS of the emergency as soon as possible.

6.11.3.2 CEHNC Emergency Coordinator

Upon notification of an on-site emergency, the CEHNC OSS may be directed by CEHNC to assume the role of Emergency Coordinator (EC). The EC will then have overall responsibility for coordinating the efforts of the OSIC and off-site emergency response agencies. The EC shall ensure that required off-site emergency services have been summoned and will also be responsible for notifying and coordinating all relevant United States and local regulatory and response agencies.

6.11.3.3 On-site Emergency Response Personnel

During site activities EODT personnel will act, to the greatest extent possible, in the role of on-site emergency response personnel. The personnel assigned to these tasks will be designated by the EODT SUXOS and UXOSO prior to initiation of site activities involving the potential for an on-site emergency. EODT on-site emergency response personnel will receive training in the response actions that they will be authorized to, and may be directed to, perform during a site emergency.

6.11.3.4 Off-site Emergency Response Services

The off-site emergency response services which may be needed in the event of a site emergency include: land based ambulance personnel and transportation, medical facilities for the treatment of physical injuries, local fire and law enforcement support, and spill response support. These resources will be contacted in the event of an emergency by the OSIC or EC by calling the emergency numbers presented in Table 6-3.

6.11.3.5 Communications

Emergency communications will be available and maintained during all on-site operations. As previously discussed, radio and cellular phone communications will be used between the field teams and the project office. The project office will have hard line communication to off-site services, and this office will be manned at all times when on-site operations are being conducted.

6.11.4 Posted Instructions and Emergency Contacts

Evacuation routes, assembly points, emergency and site control procedures, hospital routes, and emergency numbers will be discussed each day at the tailgate safety briefing to ensure all site personnel are familiar with this information. A hospital route map and the list of emergency contacts presented in Table 6-3 will be posted in all EODT office and storage areas and maintained in all site vehicles. All site personnel will be familiar with the location of these lists and maps, and will be aware of the location of the closest telephone and/or radio communications.

6.11.5 Emergency Recognition and Prevention

6.11.5.1 Small Fires

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

1. The SSHO/OSIC and SUXOS will be immediately notified of the occurrence of the fire.
2. All unnecessary personnel shall be evacuated to an upwind location.
3. EODT personnel will extinguish the fire from an upwind location.
4. The OSIC will request emergency response assistance (ambulance, fire, police) as needed for any injuries or exposures to smoke or other hazardous chemicals.
5. EODT personnel will not attempt to extinguish a fire, even a small one, if explosives are involved, and all site personnel will evacuate the site if explosives are involved.
6. Once fire fighting has begun, the OSIC shall notify the SUXOS and CEHNC OSS. After the fire is extinguished, an investigation will be initiated to determine the cause of the fire and to identify any operational changes that may be required to prevent future fires.



TABLE 6-3: EMERGENCY TELEPHONE NUMBERS

Service / Contact	Agency / Position	Telephone Number
Ambulance	Solano County Emergency Service	911 / 707-421-6330
Emergency Medical Treatment	Kaiser Foundation Hospital	707-651-1000
Local Police	Benicia Police Department	707-745-3412
Local Sheriff	Solano County Sheriff	707-553-5385
Local Fire Department	Benicia Fire Department	707-746-4275
Local EOD Unit	787 th Ordnance Co. Moffit Field, CA	650-603-8301
Military EOD Unit	52 nd Ordnance Group (EOD) Ft. Gillem, GA	404-362-5953/5978 24-hr Contact - 404-367-5222
CEHNC Safety Office	NA	(256) 895-1582 or 1589 After Hours: (256) 895-1180
Bob Nore	CEHNC Project Manager	(256) 895-1512
TBD	CEHNC On-site Safety Specialist	
Phil Curry	EODT Project Manager	(865) 988-6063
Andrew Bryson, CIH	EODT OSHM/CIH	(865) 988-6063
Steve Voland	EODT QCM	(865) 988-6063
Poison Control Center	24-hour Emergency Number	800-876-4766 (CA only)
Centers for Disease Control		800-311-3435 404-639-3534
National Response Center		800-424-8802
CHEMTREC		800-424-9300

6.11.5.2 Large Fires

In the event that a large fire occurs, or if a small fire cannot be extinguished and develops into a large fire, the following actions shall be taken:

1. The SSHO/OSIC and SUXOS will be immediately notified of the occurrence of the fire.
2. All unnecessary personnel shall be evacuated from the site to an upwind location.
3. The OSIC shall summon the local fire department and any other emergency response services (police, ambulance, hospital, etc.) as needed for the treatment of injuries or exposures to smoke or other exposures caused by the fire.



4. To the extent that it can be safely accomplished, the OSIC will direct site personnel to move vital equipment/supplies from the fire's path.
5. To the safest extent possible, and with available resources, EODT personnel will fight the fire from an upwind location.
6. At no time shall attempts be made to extinguish a fire involving explosives and all personnel will evacuate the site if the fire involves explosives.
7. Once fire fighting has begun, the OSIC shall notify the SUXOS and CEHNC OSS. After the fire is extinguished, an investigation will be initiated to determine the cause of the fire and to identify any operational changes that may be required to prevent future fires.

6.11.5.3 Explosion

In the event of an unintentional explosion, all personnel shall evacuate and help secure the site. The OSIC, SUXOS, and CEHNC OSS will immediately be notified of the situation and the OSIC shall request the required support equipment and personnel. If personnel injuries have occurred, the OSIC shall direct and coordinate the treatment of the affected personnel IAW section 6.11.8.4. After an explosion, it is essential that the site be evacuated and that no one is allowed to re-enter the area, except to possibly save a life, for at least 30 minutes after the explosion. The OSIC, in conjunction with the CEHNC OSS, will determine what actions will be taken to resolve the situation, and once resolved, the OSIC will initiate an investigation to determine the cause of the explosion. Any changes to the EODT WP or SSHP will be made and approved prior to the resumption of site activities.

6.11.5.4 Inclement Weather

In the event of inclement weather, such as heavy precipitation, electrical storms, high winds, snowstorms, dense fog, or extremely cold weather, it may be necessary to cease site operations and evacuate the site. The UXOSO shall be responsible for obtaining the local weather on a daily basis and advising the SUXOS of the forecast. If necessary, the weather service will be contacted on a more frequent basis. If inclement weather occurs, the procedures outlined below will be followed until the inclement weather passes.

1. **Heavy Precipitation:** In the event that heavy precipitation is imminent, or occurs suddenly, site operations shall be halted, equipment will be secured, and site personnel will retreat to shelter. The determination to re-start operations will be the responsibility of the SUXOS, who will consult with the UXOSO to ensure site conditions are safe for re-entry and continuation of operations.



2. **Thunderstorms:** Thunderstorms, with their associated lightning, present a significant hazard to site personnel. If a thunderstorm is noticed in the area, the UXOSO will observe the storm to determine its direction and speed. If the storm approaches the site, the UXOSO shall determine when the storm becomes a threat to the site and will call for an evacuation of the site, and site personnel will assemble in a sheltered area until the storm passes. If the UXOSO determines that it is unsafe to remain on site, the UXOSO shall call for the evacuation of the site. A severe thunderstorm watch announcement on the radio or television indicates that a severe thunderstorm is possible. A severe thunderstorm warning signifies that a severe thunderstorm has been sighted, or detected by radar, and may be approaching. Work may continue at the work site during severe thunderstorm watches; however, site work shall cease and the WZ will be evacuated during a thunderstorm or severe thunderstorm warning.
3. **High Winds:** High winds can create conditions that threaten the safety and health of site personnel. If the UXOSO determines that the wind levels on site present a hazard to site personnel, site operations will be halted and site personnel will assemble in the field office area. If wind levels are high enough, the UXOSO may even require the evacuation of the entire site until such time as conditions improve. The determination to restart operations will be the responsibility of the SUXOS in consultation with the UXOSO to ensure site conditions are safe for re-entry and continuation of operations. At no time will demolition operations be conducted when the wind speed is greater than 40km (25 miles) per hour.

6.11.6 Site Topography and Prevailing Weather Conditions

6.11.6.1 Site topography for the three sites is as follows:

1. Sector 2, consists of 15 acres situated in the north-central portion of the former Benicia Arsenal. The designated land use for this sector is "Limited Industrial/Open Space." The sector is characterized by steep terrain and scattered trees with the majority of the area being undeveloped.
2. Sector 4 has an area of 80-acres situated in the west-central part of the former Benicia Arsenal. This sector is characterized by steep terrain with scattered trees and it is undeveloped.
3. Sector 5 contains 40 acres with a designated land use of "Limited Industrial." This sector is situated in the south-central portion of the former Benicia Arsenal. Sector boundaries are defined by Interstates I-680 and I-780, on the north by a fence, and open storage area (formerly known as OS 25 and OS 25A). The sector is characterized by rolling hills,



grasslands, and scattered trees. The central area contains several buildings: the Camel Barn Museum, a parking lot, and surrounding structures.

6.11.6.2 The area climate is generally mild, moderated by the influence of the marine air. Daytime temperatures typically range from 55 to 80 degrees (°) Fahrenheit (F) in the summer and from 38°F to 53°F in the winter. Annual precipitation averages 16 inches. Most precipitation falls from October to April (average 15 inches). During the summer, a marine wind blows eastward through the Carquinez Strait with speeds ranging from 15 miles per hour (mph) in the morning to 25 mph in the afternoon.

6.11.7 Criteria and Procedures for Site Evacuation

6.11.7.1 Emergency Alerting Procedures

It will be the responsibility of the SUXOS to ensure that off-site communications are available at all times. Site operations shall not be conducted unless means of off-site communications are established. Off-site communication will be accomplished using telephone service to the responsible support agencies. The telephone numbers for all emergency services and contacts are listed in Table 6-3. These phone numbers shall be posted in the office/break area, and all site personnel shall be aware of the procedures for obtaining off-site emergency services.

6.11.7.2 Employee Alarm System

6.11.7.2.1 To alert on-site team members, each team leader and the UXOSO will have an air horn that will be sounded to inform personnel of the occurrence of an emergency. The effectiveness of the air horn will be tested during initiation of site activities in the WZ to ensure that all site personnel can clearly perceive the alarm above operational noise levels. If operational noise levels prevent site personnel from detecting the air horn alarm, other means of notification will be implemented.

6.11.7.2.2 To alert WZ personnel of the occurrence of an emergency, one long blast on the air horn will be the signal to evacuate the site immediately. The initial assembly point for each WZ will be located in a safe area as identified during the tailgate safety briefing each morning. Once WZ personnel are assembled, the SUXOS will conduct a head count of all team personnel. Once accounted for, WZ personnel will communicate with the OSIC and await the arrival and/or instructions from the OSIC, which may include: further evacuation from the site, emergency response instructions or any other instructions deemed necessary by the OSIC. Once the OSIC



arrives at the emergency site, the OSIC will assess the situation and communicate the actions to be taken.

6.11.7.3 Evacuation Routes and Assembly Points

Once on-site, and prior to the initiation of site operations, the UXOSO, in conjunction with the SUXOS, will identify the evacuation routes and assembly points for the various areas on the site. These routes and assembly points will be identified on the site map and will be communicated each morning to site personnel during the tailgate safety briefing.

6.11.7.4 Site Security and Control During Emergencies

6.11.7.4.1 During an emergency, site security and control will be paramount to controlling the possible negative effects of the emergency. Upon notification of an emergency, each team leader will initially be responsible for locating, assembling, counting and controlling their team personnel. If the team leader is unable to perform this role, the duty will be passed to another team member. Once the team has evacuated the site to the given assembly point, each team leader will maintain control over their team's personnel until the OSIC takes control of the personnel and verbally informs the team leader that the control has been transferred. This level of personnel control is needed to ensure no personnel are forgotten and that no personnel attempt any response action on their own without the knowledge of the team leader or OSIC.

6.11.7.4.2 Site access control and security will initially be conducted by EODT personnel directed to do so by the OSIC. If EODT personnel are needed for other response actions, the OSIC will request assistance from the CEHNC OSS/EC. The CEHNC OSS/EC will then request security and access control services from the Benicia Police or Solano County Sheriff Department.

6.11.8 Emergency PPE and Equipment

6.11.8.1 General Requirements

The emergency equipment listed in Table 6-4 shall be on site, stored in the location indicated, and available for use during the operation specified. Emergency equipment assigned to a team will be maintained in proper working order by the team as directed by the team leader. The UXOSO will conduct an inspection of all emergency equipment at least weekly to ensure completeness and proper working order. In the event that any of the disposable items are utilized, the UXOSO shall ensure they are replaced immediately. Site operations shall not be conducted if the required emergency equipment is not immediately available on site.



6.11.8.2 Portable Fire Extinguishers

To ensure that adequate fire fighting equipment is readily available on site, the fire extinguishers listed below will be located at the locations specified. Fire extinguishers will be stored in well-marked locations where they can be readily accessed and will be stored in locations where they are protected from damaging environmental elements. The UXOSO shall ensure that all fire extinguishers are visually inspected monthly and that these inspections are documented. All site personnel will be advised of the location and operation of fire extinguishers and will be informed of the procedures to be followed in the event of a fire. Emergency procedures for small and large fires and explosions are found in this section.

1. Flammable/combustible liquid storage areas shall have at least one 4A:20B:C fire extinguisher located within 7.5 to 23 meters (25 to 75 feet) of the storage area.
2. All vehicles shall be equipped with a fire extinguisher of not less than 10B units.
3. All vehicles used in the transport of explosives shall be equipped with two fire extinguishers of not less than 10B units or higher, with one fire extinguisher mounted or placed inside the cab of the vehicle and one mounted outside by the driver's door.
4. Temporary offices or support locations shall be equipped with a fire extinguisher of not less than 10B units.
5. At least one portable fire extinguisher having a rating of not less than 20:B units shall be located at each WZ.

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TABLE 6-4: EMERGENCY EQUIPMENT REQUIREMENTS

Emergency Equipment	No. Per Location	Area Where Item(s) Will Be Stored	Operation Requiring Specified Equipment
First Aid/Burn Kit/Burn Blanket/CPR Mask	1 ea.	Each team within the WZ	All operations
Portable Eye Wash Kit	1 ea.	Each team within the WZ	Operations involving hazardous materials
15- Minute Eye Wash	1 ea.	Field equipment trailer	All operations
Biohazard Kit	1 ea.	Each team within the WZ	All operations
Large Medical Kit with Trauma Supplies	2 ea.	1 in UXOSO vehicle and 1 in first aid provider's vehicle	All operations
Portable Stretcher	2 ea.	1 in UXOSO vehicle and 1 in field equipment trailer	All operations
Air Horn	1 ea.	Each team within the WZ	All operations
Spill Containment/Cleanup Supplies	Varies	Field equipment trailer	Operations involving hazardous materials
Fire Extinguisher	1 ea.	Each team, vehicle, and flammable storage areas	All operations
Cellular Phone	1 ea.	Each team within the WZ	All operations
Lightning Monitor	1 ea.	UXOSO	All operations

6.11.8.3 First Aid Kit Requirements

To ensure that adequate first aid supplies are available, the size and number of first aid kits shall be sufficient to accommodate the maximum number of people (including government personnel and visitors) on site at any given time. Standard first aid kits will be located with each team and two EMT type trauma kits will be maintained onsite. The EMT and standard first aid kits shall be located in the WZ and the location of the kits shall be made known to all WZ personnel.

Additionally, all first aid kits will be provided with adequate water, gel burn bandages, and other supplies necessary to cleanse burns, wounds, or lesions.

6.11.8.4 Eye Washes

Portable bottles of eyewash will be readily available in each WZ where there is a potential for hazardous materials to contact the eyes. Portable eye wash bottles will be available for immediate use while the injured person is transported to the area where the 15-minute eye flushing station will be available. After flushing, the eyes will be bandaged lightly and the person transported to the appropriate medical facility for further evaluation and treatment.

6.11.9 Decontamination and Treatment of Injured Personnel

6.11.9.1 General

It is not anticipated that personnel decontamination will be required prior to, or along with, the treatment of injured personnel. This determination is made based upon the nature of the site and the lack of site contaminants that would require the use of chemical protective clothing. The one minor exception is the chemical-resistant gloves that are required for refueling operations. These gloves would simply be removed prior to or during initial treatment if the removal can be accomplished without exacerbating the injury. Blunt-nosed scissors may be used to cut the chemical-resistant glove prior to its removal.

6.11.9.2 Assessing the Emergency

A key element to the successful treatment of an injured worker is the effective assessment of the emergency prior to the initiation of action. If on-site EODT or off-site emergency personnel are to enter the site in response to the emergency, the OSIC shall assess the incident to identify and record vital information about the site and situation. This data will be passed on to response personnel and will include, to the extent possible, the items listed below.

1. What happened (i.e., type of incident; cause of incident; the time the incident occurred; extent of chemical release; including route of migration; and extent of damage to structures, equipment, and terrain).
2. Where on the project site the incident has occurred.
3. Personnel/casualties involved, such as number, location, and condition of victims, treatment that may be required and missing personnel.

4. What could happen from this point (i.e., potential for fire or explosion, coupled with release of hazardous materials; location of all personnel in relation to hazardous areas; and potential for emergency affecting the general public or the environment).
5. Steps needed to resolve the situation such as 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; and hazards involved in rescue and response.

6.11.9.3 Rescue and Response Actions

At no time will site personnel attempt an emergency response or rescue until the situation has been assessed and the appropriate response outlined by the OSIC. Ensuring that the incident has been properly assessed and that the appropriate actions have been selected will ensure that further injuries do not occur due to poor response planning. Based on the information collected during the emergency assessment, the OSIC will select the relevant response and rescue actions that will be taken. The rescue actions that may be needed are listed below, with some actions possibly being performed concurrently and some of the actions not being required.

1. Personnel evacuation to a safe location upwind of the incident.
2. Enforce the buddy system and allow no one to enter the site unattended.
3. Survey casualties to locate all victims, assess their condition, and determine the resources needed for casualty stabilization and transportation.
4. Assess existing and potential hazards and decide whether and how to respond.
5. Request aid by contacting the required off-site personnel or facilities, such as ambulance, fire department, police, etc.
6. Allocate personnel and equipment to rescue and initiate incident response operations.
7. Control the situation and use measures to prevent the situation from migrating further.
8. Assign PPE IAW the nature and type of emergency.
9. Extricate victims and assist them from the area.
10. Decontaminate personnel, if necessary, by washing or removing outer clothing only if it can be done without causing further danger or damage to the affected personnel.
11. Stabilize injured personnel and administer any medical procedures that are necessary before the victims can be moved.
12. Transport the affected personnel via the predetermined mode as determined by their injury.

13. Record to whom the incident occurred, the time it occurred, and the destination and condition of the casualty at the time of transport.
14. Record disposition, condition, and location of all personnel affected by the emergency.

6.11.9.4 Treatment of Injured/III Personnel

In the event of an emergency involving personal injury or illness, immediate, appropriate response will be the key to preventing further injury/illness and providing comfort to the affected party. If any site personnel are injured, or if they are overcome by illness, the applicable procedures listed below will be followed.

1. Upon notification of the occurrence and the nature of the injury/illness, the OSIC will respond to the location where the injury/illness has occurred.
2. Once the OSIC arrives at the scene, the severity of the injury/illness will be assessed, the required first aid support will be provided, and the OSIC will initiate the necessary procedures needed to ensure rapid, efficient transportation of the affected person to appropriate medical support, if required.
3. If immediate life support is not required, or once the victim is stabilized, the victim's PPE will be removed to the extent possible while exercising caution not to worsen the injury.
4. If ALS and immediate transportation to a medical facility is required, the OSIC shall immediately summon emergency services. If deemed necessary by the emergency service operator, an air ambulance may be summoned to transport the affected party.
5. If additional medical attention is required, but ALS is not required, the UXOSO, or a designated person, may transport the affected person to the designated medical facility.

6.11.9.5 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 US and local regulatory agencies be notified of the emergency. Therefore, the following activities must be conducted prior to restart of site activities:

1. 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).
2. Restock and clean all equipment and supplies utilized or damaged in the emergency.
3. The EODT PM and OSHM, in conjunction with the SUXOS, UXOSO, and CEHNC OSS, shall conduct an accident investigation to determine the cause of the emergency and what preventative measures shall be taken to ensure the emergency does not occur again.



4. The EODT PM and OSHM, in conjunction with the SUXOS, UXOSO, and CEHNC OSS, shall conduct an emergency response critique to assess the effectiveness of the emergency response procedures and to identify any areas requiring improvement.
5. Complete the USACE Accident Investigation Report (Eng. Form 3394) and any other governmental or EODT accident forms.
6. Review and revise, as needed, the site operational and emergency response procedures, and, if necessary, update the SSHP to reflect the new procedures.

6.11.9.6 Documentation

Documentation related to the emergency shall be recorded in an accurate, authentic and complete fashion. Documentation shall be recorded as soon as possible after the emergency to ensure it is recorded while the events are vivid in the minds of the personnel involved. The information recorded will include:

1. A chronological record of events
2. A listing of the personnel involved, including personnel on site, site personnel who responded, personnel in charge, and off-site groups or agencies that responded
3. A listing of the actions taken to minimize the effects of or mitigate the emergency
4. The results from any air monitoring conducted during the emergency, and if applicable, results of environmental samples
5. An assessment of the potential exposures received by site personnel and the surrounding public
6. A recording of the injuries or illnesses which occurred as a result of the emergency

6.11.10 Route Maps to Medical Treatment Facility

6.11.10.1 General Instructions

During the daily tailgate safety briefing, the UXOSO will review the instructions for obtaining medical attention and transporting site personnel to the hospital. All site vehicles shall be provided with copies of the site map generated by the UXOSO and the directions provided in Section 6.11.11 along with the hospital route map presented in Appendix B. Not all on-site injuries will require ALS service and ambulance transportation to the hospital. If the UXOSO determines that an injured party can be transported to medical attention using a site vehicle, the directions presented below and on the Hospital Route Map, presented in Appendix B of this WP, will be used to transport the injured party to the Kaiser Foundation Hospital in Vallejo. Prior to the initiation of site activities,

and periodically thereafter, the hospital route will be driven by the UXOSO to ensure that the route to the hospital is free of unanticipated delays.

6.11.11 Directions to the Kaiser Foundation Hospital

Exit any of the sites to the intersection of Rose and East 2nd Street and proceed south on East Second to Interstate 780 (I780). Go west on I780 to Interstate 80 (I80). Take I80 east toward Vallejo (actual direction of travel on I80 will be northerly). Continue on I80 to Redwood Parkway and exit to Redwood Parkway west. Proceed on Redwood Parkway to the intersection with Broadway Street and turn right (north) onto Broadway Street. The first right off of Broadway Street will be approximately 0.5 miles and will be the intersection with Sereno Drive. Turn right onto Sereno Drive (east) and continue for approximately 0.2 miles to the entrance of Kaiser Foundation Hospital on the left.

6.11.12 Community Alert Program

It is not anticipated that any on-site actions will require the activation of the procedures outlined in this paragraph. To alert the community, the OSIC will notify the CEHNC OSS/EC that site hazards may migrate off the site. The CEHNC OSS/EC will then determine the degree of community alert that will be required and will request the appropriate assistance from local law enforcement.

6.12 SPILL CONTAINMENT

6.12.1 Spill Response Supplies

A portable spill response kit containing oil/solvent absorbent pillows/pads, non-sparking shovel, PPE and disposal supplies shall be maintained in a readily accessible location where fuels, oils, solvents and other environmentally harmful materials are stored on site. Upon notification of a spill, the UXOSO, or a party designated by the UXOSO, will transport this kit to the spill site for use by EODT personnel in the cleanup of the spilled materials.

6.12.2 Spill Response

It is not anticipated that site operations will involve handling large containers of hazardous waste that could be easily spilled. However, small containers (5 gallons or less) of gasoline or diesel fuel may be used and stored on site. If material from these containers is spilled, EODT personnel will follow these steps:

1. The immediate area will be evacuated, ignition sources will be extinguished, and the OSIC will be notified of the spill.

2. The EODT OSIC will evaluate the situation to ensure it is safe for personnel to begin cleanup operations.
3. The OSIC will assign the level of protection to be worn by the spill response personnel.
4. All required supplies will be assembled and positioned such that they are readily available to the spill response personnel.
5. Spill response personnel will take measures to stop the spill and will, if applicable, use an absorbent or adsorbent to collect the spilled material.
6. Using non-sparking tools, EODT personnel will collect the contaminated soil, place it in a plastic bag, and place the bag in an approved container.
7. The SUXOS will notify the CEHNC OSS that the spill occurred and will brief the CEHNC OSS as to the cleanup actions that were taken by EODT personnel.
8. The CEHNC OSS will then provide the SUXOS guidance on disposal of the drummed contaminants and any other actions that must be taken.

6.13 HEAT/COLD STRESS MONITORING

6.13.1 Introduction to Heat Stress

Due to the time period during which this project will be conducted, heat stress will not be a safety or health issue during the performance this OERA. Therefore, the EODT procedures for addressing heat stress are not addressed in this SSHP and will not be applied to this project. However, cold stress concerns will be present during this project and are therefore included in this SSHP.

6.13.2 Introduction to Cold Stress

The effects experienced by site personnel when working in cold environments depend upon many environmental and personal factors, such as ambient air temperature, wind speed, duration of exposure, type of protective clothing and equipment worn, type of work conducted, level of physical effort, and health status of the worker. In cold environments, overexposure can cause significant stress on the body that can lead to serious, and potentially permanent, injury. Cold may affect exposed body surfaces and extremities or may affect the deeper body tissues and body core. Presented below is information about the most common cold stress disorders, their signs, symptoms, effects, and control techniques.

6.13.3 Cold Stress Disorders

6.13.3.1 Immersion Foot or Trench Foot

These two cold injuries occur as a result of exposure to cool or cold weather and persistent dampness or immersion in water. Immersion foot usually results from prolonged exposure when air temperatures are above freezing, whereas trench foot normally occurs from shorter exposure at temperatures near freezing. The symptoms for each disorder are similar and include tingling, itching, swelling, pain and/or numbness, lack of sweating, and blisters.

6.13.3.2 Frostbite

Frostbite occurs when there is actual freezing of the water contained in the body tissues. This usually occurs when temperatures are below freezing, but excessive wind can result in frostbite even when ambient temperatures are above freezing. Frostbite can occur from several types of cold exposure, including exposure of bare skin to cold and wind; exposure to extremely cold ambient temperatures; skin contact with rapidly evaporative liquids (gasoline, alcohol, or cleaning solvents) at temperatures below 39.2°F; or skin contact with metallic objects whose temperatures are below freezing. The extremities are usually affected first since the body's initial response to cold stress involves decreasing the blood flow to the extremities, thereby reducing heat loss. The tissue damage caused by frostbite can be superficial, near the surface of the skin, or extend deep into body tissues that can cause severe tissue damage. During the initial stages of frostbite, the skin may have a prickly or tingling sensation and will later become numb with cold. The appearance of the affected skin may range from superficial redness of the skin to white, hard, frozen-looking tissues.

6.13.3.3 Hypothermia

Hypothermia results when the body loses heat faster than it can be produced. When this occurs, the blood vessels in the skin and extremities constrict, reducing the flow of warm blood to those areas that have a high surface area-to-volume relation. This reduction in blood flow reduces heat loss and usually affects the peripheral extremities first. Ears, fingers, and toes begin to experience chilling, pain, and then numbness due to loss of both blood flow and heat. Shivering begins as the body's core temperature begins to drop, and the body uses the shivering to compensate and create metabolic heat. Shivering is often the first sign of hypothermia. The pain and numbness in the extremities is an indication that the heat loss is increasing, but when shivering becomes severe and uncontrollable, the heat loss in the body core has become extreme. Further heat loss produces speech difficulty, reduced mental alertness, forgetfulness, loss of manual dexterity, collapse, unconsciousness, and finally death.

6.13.4 Treatment of Cold Stress Disorders

6.13.4.1 The intent of all cold stress treatment is to bring the deep body core temperature back to its normal temperature of about 98.6°F. Work performed in cold environments should be discontinued for any worker who exhibits the signs or symptoms associated with hypothermia or frostbite. Workers exhibiting those symptoms should be brought to a warm area and allowed to rest and warm up. If a worker's clothing becomes wet, reducing its insulating effect, it should be removed and replaced by dry clothing, or allowed to dry before the worker resumes work. Warm, non-alcohol, decaffeinated drinks (not coffee) or soup should be given to increase the body core temperature, and re-warming should be gradual.

6.13.4.2 For frostbite, the victim should be sheltered from the wind and cold and given warm drinks. If the frostbite is superficial, the frozen area(s) should be covered with extra clothing or blankets, or warmed against the body. **Do not use direct heat, and do not pour hot water over or rub the affected area.** Warming should be gentle and gradual. Failure to do this could lead to bleeding in the tissues and increase the possibility of infection. If the frostbite is deep (i.e., the affected area is frozen and hard to the touch), immediate medical attention should be obtained. The safe thawing of deep frostbite is beyond the expertise and facilities found on site.

6.13.5 Prevention of Cold Stress Disorders

6.13.5.1 Cold Stress Monitoring

Guidance for the monitoring of cold stress is provided by the ACGIH in the Threshold Limit Value (TLV) booklet. In order to comply with the cold stress TLV, EODT shall implement the following monitoring schedule:

1. A suitable thermometer for measuring ambient temperatures shall be available on sites when the air temperature is below 16°C (60.8°F).
2. Whenever the air temperature on site falls below minus 1°C (30.2°F), the temperature shall be measured and recorded at least once every two hours.
3. Whenever the air temperature on site falls below minus 1°C (30.2°F), the wind speed shall be measured and recorded together with the air temperature.
4. The equivalent wind chill temperature shall be obtained from Table 6-5 and recorded in all cases when air speed measurements are required.
5. The SSHO shall utilize the applicable TLV limits listed in Table 6-6 to determine if elevated control measures must be implemented during site activities.

TABLE 6-5: EQUIVALENT CHILL TEMPERATURE

EST. WIND SPEED (In mph)	ACTUAL TEMPERATURE READING (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT CHILL TEMPERATURE (°F)											
CALM	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40 *	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
	LITTLE DANGER In < 1 hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
Trench foot and immersion foot may occur at any point on this chart.												

* - Wind speeds greater than 40 mph have little additional effect

TABLE 6-6: ACGIH COLD STRESS TLVs

TLV Temperature	Working Conditions or Task To Be Performed	Required Control Measures
< 60.8°F	Any site or work condition.	Thermometer required on site.
	Fine work performed continuously for more than 10-20 min.	Special provisions for keeping the hands warm, i.e., radiant heaters, warm air jets, etc.
	Tasks with sedentary work load.	Gloves are to be used by workers.
< 39.2°F	Site with windy conditions.	Reduce cooling effect of wind by using shields or an easily removable windbreaker.
	Task where exposed areas of the body cannot be protected from cold or frostbite.	Auxiliary heating units are to be supplied.
	Tasks where clothing may become wet with either perspiration or water.	Provisions shall be made to allow site personnel to change into dry clothes.
	Workers handling evaporative liquids.	Special precautions needed to ensure clothing does not become soaked with liquid.
	Tasks with light work load.	Gloves are to be used by workers.
< 35.6°F	Workers who become immersed in water or who's clothing becomes wet.	Treatment for hypothermia and immediate change of dry clothing provided.
< 30.2°F	Any task.	Air temperature and wind speed (if over 5 mph) recorded at least every 4 hours. Cover metal handles with insulating material.
< 19.4°F Air**	Tasks with moderate work.	Gloves to be used by workers.
< 19.4°F ECT*	Any task.	Heated warming shelters with warm drinks will be made available for breaks. Record ECT along with air temperature readings. Warn personnel not to contact unprotected metal parts with bare skin.
< 10.4°F ECT	Any task.	Buddy system enforced, protect from wind to greatest extent possible, acclimatize workers, moderate workload to prevent perspiration, and conduct worker cold stress training.
< -11.2 or < 0°F with 5 mph wind	Personnel who routinely work at this temperature.	Personnel are to be medically certified as suitable for this level of exposure.
< -25.6 ECT	Any level of work or type of task.	No unprotected skin exposure.

* ECT - Equivalent chill temperature.

** -Air - Ambient air temperature

TABLE 6-7: TLV WORK/REST SCHEDULE FOR 4-HOUR WORK SHIFT

Air Temp. °F Approx.	No Wind		5 MPH Wind		10 MPH Wind		15 MPH Wind		20 MPH Wind	
	Max. Work Period	No. of Breaks								
-4 to -8	Normal	1								
-9 to -13	Normal	1	Normal	1	Normal	1	Normal	1	75 min.	2
-14 to -18	Normal	1	Normal	1	Normal	1	75 min.	2	55 min.	3
-15 to -19	Normal	1	Normal	1	75 min.	2	55 min.	3	40 min.	4
-20 to -24	Normal	1	75 min.	2	55 min.	3	40 min.	4	30 min.	5
-25 to -29	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease.	
-30 to -34	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease.			
-35 to -39	40 min.	4	30 min.	5	Non-emergency work should cease.					
-40 to -44	30 min.	5	Non-emergency work should cease.							
-45 & Below	Non-emergency work should cease.				Non-emergency work should cease.					

1. Schedule applies to any 4-hour work period with moderate-to-heavy work activity with warm-up cycle in a warm location and with an extended break in a warm location (e.g., lunch) at the end of the 4 hours. For light-to-moderate work: apply the schedule one step lower.
2. The following is suggested as a guide for estimating wind velocity if other, more accurate means are not available: 5 mph - light flag moves; 10 mph - light flag fully extends; 15 mph - raises newspaper sheet; 20 mph - blowing and drifting snow.
3. This table applies only to acclimatized workers with appropriate dry clothing for winter work.

6.13.5.2 Controls implemented by site personnel

During work in cold environments, the SSHO will use the tailgate safety briefing to inform site personnel of the temperature and wind conditions anticipated for the day's site activities. The SSHO will also advise site personnel of the general practices, listed below, which will be utilized in the prevention and control of cold stress.

1. Wear adequate, appropriately layered clothing, including a water-repellent outer layer if precipitation is forecast.
2. Use layered clothing, which should include an innermost layer (such as cotton or silk) to trap heat and absorb perspiration, an insulating layer of wool or synthetic fiberfill (such as polypropylene), a layer of work-weight clothing, and an outer protective layer designed to retain heat and be wind/waterproof (such as nylon or Gortex).
3. Wear gloves, socks and a hat that are synthetic or wool insulated.
4. Remove outer layers of clothing during breaks in heated shelters to prevent inner layers from getting wet with perspiration.
5. Cover all exposed skin and use a wind breaker in windy, cold conditions.
6. Eat well-balanced meals and maintain an adequate intake of nonalcoholic, decaffeinated fluids.
7. Seek shelter in a warm, protected area when signs and symptoms of cold stress become evident.
8. Protect clothing from getting wet with perspiration during site activities by monitoring and moderating the level of physical activity and, if necessary, removing excess clothing.

6.13.5.3 Work/rest cycles

To date, there are no federally mandated regulations related to work/rest schedules for cold stress. The ACGIH has published a work/rest schedule provided in Table 6-7. However, this table only applies to, and should be implemented for, temperatures below 0°F. Therefore, for temperatures above 0°F, site personnel will take a minimum of one break every hour. For temperatures between 0°F and 30°F and for temperatures above 30°F, workers shall take at least one rest period every two hours or whenever they exhibit signs or symptoms of cold stress.

6.14 SOPs, ENGINEERING CONTROLS, AND WORK PRACTICES

6.14.1 General

This Chapter outlines the engineering controls, SWPs, and Standing Site Orders which will be followed by all site personnel to eliminate, or reduce, the risk of exposure to recognized site hazards. These control measures are presented as a working guide for site personnel and are not intended to cover all EODT, OSHA, or USACE compliance issues. For reference, a copy of the EODT Corporate Safety and Health Program will be available on-site, as will the EODT task-specific SOPs. Since the SOPs are generic in nature and are intended to compliment this SSHP,

many of the SOPs may contain information that may be superfluous to this project. Prior to, and during site operations, the UXOSO and SUXOS will carefully read the SOPs and determine which SOP provisions apply to this project. As a rule, all site personnel will comply with the following guidelines:

1. The applicable regulatory requirements of 29 CFR 1910, 29 CFR 1926, and EM 385-1-1 shall be followed during all site activities.
2. All site personnel shall immediately report to the UXOSO any conditions that do not comply with, or are not addressed by this SSHP.
3. Site personnel will wear the PPE as specified in paragraph 6.6 of this SSHP.
4. All investigation, handling, transportation, and demolition of OE found on site will be conducted IAW the CEHNC Basic Safety Considerations for Unexploded Ordnance (UXO), revised 22 May 2000.
5. Any bites or stings received from wildlife will be reported to the UXOSO, who will then determine the appropriate course of action to be taken to treat the bite.
6. Personnel in vegetated or wooded areas will wear long-sleeve shirts with the sleeves rolled down to reduce contact with, and injury from, hazardous or poisonous plants.
7. Site personnel shall inform the UXOSO of any known medical conditions that may cause, or result in, an adverse health condition. This includes hypersensitive allergic reactions to stinging and biting insects or contact with poisonous plants; diabetes; high blood pressure; skin or eye sensitivity to sunlight and UV radiation; chronic illness; and acute illnesses, such as a cold, the flu, or stomach/intestinal disorders. Persons with known hypersensitive allergic reactions to stinging/biting insects or toxic plants shall carry appropriate emergency medical antidotes on their person at all times when on site.
8. Site personnel shall not participate in horseplay or other prohibited acts that could cause harm or injury to site personnel, property, or the environment.

6.14.2 Engineering Controls

When personnel exposure to site hazards is unavoidable, sound safety and health practices recommend the development and use of engineering controls that remove the potential for personnel exposure. This form of hazard control is the preferred method, however, due to the dynamic and complex nature of site operations on an OE site, the effective design and implementation of engineering controls is typically not feasible. However, during project activities, the feasible engineering controls listed below will be used.



1. Engineering Controls as delineated in Use of Sand Bags for Mitigation of Fragmentation and Blast Effects due to Intentional Detonation of Munitions, Document Number: HNC-ED-CS-S 98-7, date August 1998, will be applied as necessary to comply with MSDs already in existence for OE items anticipated on this project.
2. All powered hand tools will be operated with the manufacturer's guards in place.

6.14.3 Site Rules / Prohibitions

6.14.3.1 Buddy system procedures

All work at this site shall be performed using the buddy system. Team members shall be trained to keep in visual contact with each other at all times. Buddy system training shall also stress the need for buddy team members to remain constantly aware of slip, trip, and fall hazards; lifting hazards; symptoms associated with exposure to chemical substances; location of areas on site with restricted access; temperature extremes; and other general safety and health hazards within their work area that could adversely affect their buddy.

6.14.3.2 Eating, drinking and smoking restrictions

Eating and smoking during on-site operations will be conducted only in designated areas, at designated break times, and only after personnel have washed their face and hands using available towelettes or other sanitary means. At no time will personnel smoke while conducting any operations within the grid.

6.14.3.3 Standing site rules

To maintain safety and health awareness, a list of standing site rules has been developed which outlines the practices that must be followed at all times. These standing orders will be enforced by the UXOSO, and personnel violating these orders may be subject to disciplinary action. The general standing orders for the site and the WZ are listed in Tables 6-8 and 6-9. As a reminder to site personnel, these tables will be posted in the office trailers and equipment storage areas and will be reviewed periodically during the tailgate safety briefings.

(This space intentionally left blank.)



TABLE 6-8: GENERAL SITE RULES AND PROHIBITIONS

1. Running and horseplay are prohibited in all areas of the site.
2. Ignition of flammable materials in any work area is prohibited, unless approved in writing by the UXOSO.
3. Buddy system procedures will be enforced during all site operations.
4. The number of personnel in any work area will be the minimum number necessary to perform work tasks in a safe and efficient manner.
5. Site personnel will check in with the UXOSO prior to leaving the site and again upon returning to the site.
6. Site visitors are to be escorted by UXO-qualified EODT personnel at all times.
7. Site personnel will perform only those tasks they are qualified to perform.
8. Site personnel will remain aware of site conditions at all times and will alert the UXOSO to any changes that could pose a hazard to site personnel, the environment, or the public.
9. All site personnel are cautioned not to walk, kneel or sit on any surface with potential leaks, spills of contamination.
10. Remember, "When in doubt, don't." Ask questions first.

TABLE 6-9: WORK ZONE RULES AND PROHIBITIONS

1. No matches, lighters, or other spark sources are allowed in any designated WZ.
2. No personnel will enter a designated WZ without authorization from the SUXOS or UXOSO.
3. With the exception of taking fluids to prevent dehydration, no eating, drinking, or other hand to mouth/face activity will be permitted in a WZ unless proper hygiene has been performed and then only in designated areas of the WZ.
4. Use of fluids in the WZ will only be allowed after hands and face have been washed or wiped with a disposable towelette.
5. Always have your buddy with you in this zone, and follow the buddy system procedures.
6. No personnel allowed in this area without appropriate training, medical surveillance and PPE as specified by the SSHP.
7. Remain alert to site conditions and report any changes or unusual occurrences to the UXOSO.
8. Verbal communication shall be immediately available at all times between the WZ and off-site emergency resources.
9. Remember: **Site Safety and Health Are Everyone's Responsibility.** Do your part.

6.14.4 Material Handling Procedures

Site personnel will exercise care in lifting and handling heavy or bulky items. Materials being lifted either mechanically or manually will not be moved, or suspended, over personnel unless positive precautions have been made to protect the personnel from falling objects. Whenever heavy or bulky material is to be moved manually, the size, shape, and weight of the object and the distance and path of movement must be considered to prevent joint and back injuries. The following hierarchy shall be followed in selecting a means for material handling:

1. Movement of the material by mechanical device (i.e., lift truck, crane, etc.)
2. Movement by manual means using mechanical aid (i.e., dolly or cart)
3. Movement manually with protective equipment (i.e., lifting belt or lifting monitor)

The lifting fundamentals listed below address the proper manual material lifting procedures. These lifting procedures will be followed whenever personnel are required to lift objects.

1. A firm grip on the object is essential; therefore, the hands and object shall be free of oil, grease, and water, which might prevent a firm grip.
2. The hands, and especially the fingers, shall be kept away from any points that cause them to be pinched or crushed, especially when setting the object down.
3. The item shall be inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces and pinch points, and gloves shall be used, if necessary, to protect the hands.
4. The feet shall be placed far enough apart for good balance and stability.
5. Personnel shall ensure that solid footing is available prior to lifting the object.
6. When lifting, personnel shall get as close to the load as possible, bend their legs at the knees, keep their back as straight as possible, and lift the object with the legs, as they are straightening from their bending position.
7. Never carry a load that cannot be seen over or around.
8. When placing an object down, the stance and position are identical to that for lifting, with the back kept straight and the legs bent at the knees, while the object is lowered.
9. If needed, EODT shall provide back support devices to aid in preventing back injury during lifting activities.
10. When two or more people are required to handle an object, care should be taken to ensure the load is lifted and distributed uniformly between the individuals carrying the load. Each person, if possible, shall face the direction in which the object is being carried.

6.14.5 Drum / Container Handling Procedures and Precautions

No drum or container handling is anticipated for this project and therefore procedures for these operations have not been included in this document.

6.14.6 Confined Space Entry Procedures

No confined space entry operations will be conducted. At no point will EODT personnel enter a trench or excavation that is greater than five feet in depth without the excavation first being inspected by the UXOSO to determine the need for sloping or shoring and its potential for being a confined space.

6.14.7 Hot Work, Fire Protection/Prevention, and Electrical Safety

6.14.7.1 Hot Work Practices

No hot work is anticipated for this project.

6.14.7.2 Causes of Fires and Explosions

Although fires and explosions may arise spontaneously, they are more commonly the result of carelessness during the conduct of site activities, such as during refueling of heavy or hand-held equipment. Some potential causes of explosions and fires include:

1. Ignition of explosive or flammable chemical gases or vapors by external ignition sources.
2. Agitation of shock or friction-sensitive compounds.
3. Sudden release of materials under pressure.

6.14.7.3 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. Site personnel involved with potentially flammable material or operations shall follow the guidelines listed below and EM 385-1-1, Section 9 to prevent fires and explosions:

1. Prior to initiation of site activities involving explosive/flammable materials, all potential ignition sources shall be removed or extinguished.
2. Non-sparking and explosion-proof equipment shall be used whenever the potential for ignition of flammable/explosive gases/vapors/liquids exists.
3. Smoking shall be prohibited at, or in the vicinity of, operations, which may present a fire hazard, and the area shall be conspicuously posted with signs stating **No Smoking or Open Flame Within 50 Feet.**

4. Flammable and/or combustible liquids must be handled only in approved, properly labeled metal safety cans equipped with flash arresters and self-closing lids.
5. Transfer of flammable liquids from one metal container to another shall be done only when the containers are electrically interconnected (bonded).
6. The motor of machines being fueled shall be shut off during the fueling operations.
7. Outdoor flammable/combustible materials storage areas will be lined and contained; located 50 feet from buildings; and kept free of weeds, debris and other combustible materials.

6.14.7.4 Fire Protection

To ensure adequate fire protection, the UXOSO will inspect the site to ensure that all flammable and combustible materials are being safely stored in appropriately configured storage areas and containers. The UXOSO will also ensure that no flammable/combustible materials are stored near any sources of ignition and that sources of ignition are removed a safe distance from storage areas. If needed, storage areas will be segregated from the remainder of the site through the use of flagging and signs. Portable fire extinguishers shall be located on site IAW the requirements in paragraph 6.11.8 of this SSHP.

6.14.7.5 Electrical safety procedures

For this project, no electrical wiring installation is anticipated. However, the use of electrical tools and apparatus safety will be conducted in accordance with OSHA Standard 29 CFR 1910.137(2), and EM 385-1-1, Section 11. These requirements include, but are not limited to:

1. All electrical equipment will be of a type listed by Underwriters Laboratories (UL) or Factory Mutual Engineering Corp. (FM) for the specific application.
2. Flexible cord passing through work areas will be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, or pinching.
3. Patched, oil-soaked, worn, or frayed electric cords or cables will not be used.
4. Extension cords or cables will not be fastened with staples, hung from nails, or suspended by wire.
5. Portable and semi-portable electrical tools and equipment will be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
6. Semi-portable equipment, floodlights, and work lights will be grounded, and the protective ground will maintained during moving unless supply circuits are de-energized.

7. Tools protected by an approved system of double insulation, or its equivalent, need not be grounded.
8. UL listed ground fault circuit interrupters (GFCIs), calibrated to trip within the threshold values of $5 \text{ ma} \pm 1 \text{ ma}$, are required on all circuits used for portable electric tools.
9. Flexible cord sets will be UL listed, contain the number of conductors required for the service plus an equipment ground wire and will be classified as hard usage or extra hard usage (identified by "outdoor" or "WA" printed on the jacket).

6.14.8 Excavation and Trenching Safety

The general safety precautions listed below, as well as those listed in EM 385-1-1, Section 25, Subpart P of 29 CFR 1926, will be followed when conducting anomaly excavation with EMM.

1. The excavation(s) will be inspected daily prior to commencement of work activities.
2. Evidence of cave-ins, slides, sloughing, or surface cracks will be cause for work to cease until necessary precautions are taken to safeguard workers.
3. Excavations 1.5 m (5 ft), or deeper, which cannot be sloped at a $1^{1/2}$ to 1 ratio, will require a competent individual, with the aid of a registered civil engineer or soils specialist, to design and install a protective system.
4. Protective systems shall be selected from OSHA 29 CFR 1926 Subpart P and/or designed by a registered professional civil engineer;
5. Spoils and other materials will be placed a minimum of 0.61 meter (2 ft) from the edge of the excavation.
6. Materials used for sheeting, shoring, or bracing will be in good condition, and timbers will be sound, free of large or loose knots, and of appropriate dimensions for the excavation.
7. Safe access will be provided into the excavation(s) by means of a gradually sloped personnel access/egress ramp, or ladders or stairs will be provided.
8. Ladders will be extended three feet above grade level, and will be secured to prevent movement.
9. Excavations four feet or more in depth will have a means of egress at a frequency such that lateral travel to the egress point does not exceed 7.5 m (25 ft).
10. If the depth of an excavation is greater than 1.2 m (4 ft), it will be inspected by the UXOSO to determine if it meets the criteria for a confined space.
11. If an excavation is determined to be a confined space, the excavation will be halted and the EODT Confined Space Program will be submitted to the KO for approval.



6.14.9 Machinery Guarding

In order to protect site personnel from unguarded moving machinery and equipment surfaces, the requirements found in Subpart O of 29 CFR 1910, Section 16B of USACE EM 385-1-1, and the general provisions listed below will be followed:

1. All reciprocating, rotating or moving parts of machinery or equipment shall be guarded IAW manufacturer's specifications if they create a hazard through contact with personnel.
2. All hot surfaces of equipment shall be guarded or insulated to prevent injury and fire.
3. No guard, safety appliance, or device shall be removed from machinery or equipment or made ineffective except when making immediate repairs, lubrication, or adjustments, and then only after the power has been shut off.
4. All guards or safety appliances removed for repair, lubrication, or adjustments will be replaced immediately upon completion of said activity and before the power is restored.

6.14.10 Lockout / Tagout

While LO/TO procedures are not typically needed for OE operations, there is a potential that some maintenance operations on equipment and facilities will require the control of energized systems. Energized systems are defined as those systems that contain residual or stored energy, or are connected to an energy source. Site operations involving the construction, installation, set up, adjustment, modification, inspection, maintenance or servicing of machines or equipment may require the use of LO/TO procedures to ensure the protection of site personnel. These activities may include the lubrication, cleaning or unjamming of machines or equipment, and making adjustments where site personnel are exposed to the unexpected energization or startup of the equipment or the release of hazardous energy. During the initial startup of site operations, the OSHM and UXOSO will determine what potential site operations may require the use of LO/TO procedures to control energized systems. The SSHO will then have the responsibility to apply the EODT LO/TO SOP located in the CSHP.

6.14.11 Fall Protection

Fall protection measures will not be required for this project since no personnel will be conducting operations at a height of greater than four feet from the ground..



6.14.12 Hazard Communication

In order to comply with the requirements of the OSHA Hazard Communication (HAZCOM) Standard, 29 CFR 1910.1200, the UXOSO will ensure personnel receive HAZCOM training at the time of initial site assignment or when they begin working with hazardous substances. To ensure site personnel are knowledgeable of the general requirements of the OSHA HAZCOM standard, the following will be maintained on site and the site personnel will be familiarized with the relevant information presented in the following:

1. The basic OSHA Hazard Communication Standard including employee rights under the regulation.
2. A listing of the operations/processes where hazardous chemicals are used and the potential for exposure exists.
3. The location and basic elements of the EODT Hazard Communication Program, an inventory of the hazardous substances used on site, and the location and availability of the Material Safety Data Sheets (MSDSs).

HAZCOM training will be documented by the UXOSO using the EODT Hazard Communication Training Form. This documentation will be maintained on site for the duration of the project and later incorporated in the employee's personal training file. MSDSs for hazardous products used on site will be maintained by the UXOSO in the field office. Workers will be advised of the location and contents of these MSDSs IAW the site specific and hazard information training requirements. EODT subcontractors will comply with the requirements presented above and will supply the EODT UXOSO with copies of the MSDSs for any materials brought on site by the subcontractor which contain hazardous substances.

6.14.13 Illumination

In order to control the potential for injury or illness involved with situations where site personnel have limited visibility, EODT personnel, as a general rule, will conduct on-site operations during the time period from 30 minutes after sunrise to 30 minutes before sunset. All office and storage facilities will be supplied with adequate artificial or ambient light so as to ensure the safe performance of operations within the facility.

6.14.14 Sanitation

6.14.14.1 Water supply

An adequate supply of potable (drinkable) water shall be provided on site at all times and will be supplied IAW the following provisions:

1. Containers will be clearly marked, be capable of being tightly closed, equipped with a tap, maintained in a sanitary manner, and cleaned at least weekly.
2. Where single service cups are provided, separate sanitary containers will be provided for the storage of the unused cups and for the disposal of the used cups.
3. Water or other supplied beverages shall not be dipped from the container by any means, and use of a common cup shall not be allowed.
4. Use of non-potable water is not anticipated; however, if containers of such water are used, they will be conspicuously labeled "Caution: water unfit for drinking, washing, or cooking."

6.14.14.2 Toilet facilities

Under field conditions where a project site is not provided with a sanitary sewer system, temporary toilet facilities shall be located at the site. Chemical toilets will be used by EODT to fulfill this requirement. Each temporary toilet shall be naturally lighted, have ventilation, be lockable from the inside, and be serviced weekly. The minimum requirements for toilet facilities can be found in the OSHA Standard 29 CFR 1910.120(n). Due to the size of the project site and the number of personnel working on site, EODT will provide one temporary toilet near the site.

6.14.14.3 Washing facilities

Hand and face washing facilities will be utilized by all personnel exiting the WZ and prior to any eating, drinking, tobacco use, or other hand-to-face activities. Due to the remoteness of the site and the lack of immediately available water resources, handiwipes and rinse water will be provided for on-site hand and face washing.

6.14.14.4 Site Housekeeping

All work areas will be maintained in a clean/neat fashion, free of loose debris and scrap. Any materials/equipment not being used will be removed and stored or disposed of accordingly. All work areas shall be supplied with a trash receptacle that includes a lid. The contents of all trash receptacles will either be removed from the site daily or emptied daily into an on-site central storage container that will be tightly closed each night prior to departure from the site.

6.14.15 Signs and Labels

An important element of site safety involves providing site personnel with information related to hazardous operations, areas, and materials. To ensure effective, consistent communication of these



hazards, the requirements of OSHA 29 CFR 1910.145 and USACE EM 385-1-1, Section 8 will be implemented whenever signs, tags, or labels are used on site.

6.14.16 Power and Hand-tool Operation

6.14.16.1 Power tools

To control the hazards associated with power tool operation, the requirements outlined in 29 CFR 1910, Subpart P; 29 CFR 1926, Subpart I; and EM 385-1-1, Chapter 13; and the safe work practices listed below shall be observed when using power tools.

1. Operation of power tools shall be conducted by personnel trained in the use of the tool, its operation, and safety precautions.
2. Power tools shall be inspected prior to use and defective equipment shall be removed from service until repaired.
3. Power tools with guards for moving parts shall have such guards in place prior to and during use, and loose fitting clothing or long hair shall be secured away from moving parts.
4. Hands, feet, etc., shall be kept away from all moving parts.
5. Maintenance and/or adjustments to equipment shall not be conducted while it is in operation or connected to a power source, and maintenance on gasoline-powered tools shall be conducted only after the spark plug has been removed and secured.
6. An adequate operating area shall be provided, allowing sufficient clearance and access for operation, and good housekeeping practices shall be followed at all times.

6.14.16.2 Hand tools

Use of improper or defective tools can contribute significantly to the occurrence of accidents on site. Therefore, the requirements outlined in EM 385-1-1, Chapter 13 and the safe work practices listed below shall be observed when using hand tools:

1. Hand tools shall be inspected for defects prior to each use.
2. Defective hand tools shall be removed from service and repaired or properly discarded.
3. Tools shall be selected and used in the manner for which they were designed.
4. Be sure of footing and grip before using any tool.
5. Do not use tools that have split handles, mushroom heads, worn jaws, or other defects.
6. Leather work gloves shall be worn to increase gripping ability and to protect the hand if a cut, laceration, or puncture hazard exists during the use of the tool.
7. Safety glasses or a face shield shall be used if use of tools presents an eye/face hazard.
8. Do not use makeshift tools or other improper tools.

9. When working on elevated surfaces, tools shall be secured to ensure they cannot fall on someone below.

6.14.17 Biological Hazards

Since this project is scheduled for fall to winter, the potential for contact with biological hazards will be reduced. The anticipated cold weather conditions should preclude, or significantly reduce, the possibility of encountering biological hazards such as: stinging insects like bees, wasps and hornets; biting arthropods such as spiders, ticks and chiggers; and poisonous snakes. However, even though the weather should be cold, there will still be a potential for contacting, and experiencing adverse effects from, hazardous plants, such as poison ivy, oak and sumac, and thorn bushes. Therefore, a discussion of the hazards associated with these types of plants is presented in this section. However, the UXOSO and site personnel will refer to the EODT Biological Hazards SOP for data related to potential biological hazards if weather conditions or on-site sightings indicate a potential hazard. The UXOSO will be responsible for providing briefings and selecting from the Biological Hazards SOP the requisite controls for any biological hazards identified. Employee awareness and the safe work practices outlined below and in the Biological Hazards SOP should reduce the risk associated with these hazards.

6.14.17.1 Plants Causing Skin and Tissue Injury

The plants presenting the greatest degree of risk to site personnel (i.e., potential for contact versus effect produced) are those that produce tissue injury and skin reactions. Contact with splinters, thorns, and sharp leaf edges is 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 noninfectious skin lesions and the introduction of fungi or bacteria through the skin or eye. This is especially important in light of the fact that the warm, moist environment created inside impermeable protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes, should report immediately to the UXOSO for initial care and continued observation of the injury.

6.14.17.2 Plants Causing Skin Reactions

The skin reaction associated with contacting these plants is caused by the body's allergic reaction to toxins contained in oils produced by the plant. Becoming contaminated with the oils does not require contact with only the leaves. Contamination can be achieved through contact with other parts of the plant such as the branches, stems or berries, or contact with contaminated items such as

tools and clothing. The allergic reaction associated with exposure to these plants may include: blistering at the site of contact; reddening, swelling, itching and/or burning at the site of contact; pain, if the reaction is severe; and 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. The rash usually disappears in one to two weeks in cases of mild exposure and up to three weeks when exposure is severe. The preventative measures listed below can prove effective for most site personnel:

1. Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report and mark poisonous plants found on site.
2. Wash hands, face or other exposed areas at the beginning of each break period and at the end of each workday.
3. Avoid contact with contaminated tools, equipment, and clothing, and wash contaminated tools, equipment and clothing on a daily basis.
4. Barrier creams, detoxification/wash solutions, and orally administered desensitization may prove effective and should be tried to find the best preventative solution.

6.14.17.3 Snakes

When site activities are conducted in warm weather and in grassy or wooded areas, the potential for contact with poisonous snakes becomes a very real danger. However, due to anticipated weather conditions, the threat of snakes will be significantly reduced since the indigenous population of venomous snakes should be hibernating during EODT's on site activities. If site activities extend into warm weather, the UXOSO will provide site personnel with a briefing, to include pictures, related to the indigenous population, and snake leggings will be issued.

6.14.17.4 Other Hazardous Wildlife

With the exception of Sector 5, the areas where EODT will be conducting operations is primarily undeveloped natural areas. According to the EE/CA report, mountain lions have been seen within the operational areas due to the presence of mule deer and other non-predatory wildlife. EODT personnel will remain alert to the potential for encountering these animals and will immediately notify the UXOSO if one is sighted. If encountered, personnel will immediately retreat to site vehicles and report the incident to the SUXOS. The SUXOS and UXOSO in coordination with the CEHNC OSS will determine if site operations will be suspended and/or relocated until the animal has cleared the area.



6.14.18 OE Hazards

6.14.18.1 General OE Site SWPs

For all site activities, the OE procedures and practices listed below shall be strictly enforced.

1. All OE-related activities shall be conducted IAW applicable sections of the Basic Safety Concepts for Unexploded Ordnance (UXO).
2. All OE items will be independently identified by two UXO-qualified technicians.
3. Only the minimum number of personnel required to perform a given OE-related activity will be involved in the operation.
4. Movement and handling of OE will be kept to a minimum at all times.
5. Only EODT UXO-qualified personnel will be involved in the investigation, identification, movement, and handling of known or potential OE items and explosive materials.
6. The preferred method of OE disposal is BIP; however, to reduce the number of times personnel must handle explosive demolition materials, those items identified as being unfuzed and safe to move may be collected and consolidated for disposal.
7. No smoking, or possession or use of open flame or spark sources will be allowed in the EZ, unless approved by the UXOSO or team leader, and then only in designated areas.

6.14.18.2 Debris Removal Activities

EODT UXO-qualified personnel will use the procedures listed below for the characterization of debris and potential OE at former Benicia Arsenal:

1. Only EODT UXO-qualified personnel will investigate potential OE items.
2. In all cases where OE is identified, the procedures listed below will be followed to determine the disposition of the OE:
 - a. Those OE items that are identified as being unfuzed and safe to move by two EODT personnel will be removed from the work area and temporarily stored in a sandbagged holding area located on site until they are disposed of on site at the end of the workday according to the procedures outlined in the WP;
 - b. If an OE item is identified as being fuzed or unsafe to move by EODT personnel, the item will be left in place and disposed of by BIP procedures IAW the WP procedures and guidance from the CEHNC OSS.

6.14.18.3 OE SWPs for Non-UXO-Qualified Personnel

Non-UXO-qualified personnel on site shall follow the SWPs listed below during all site activities:



1. Non-UXO-qualified personnel shall receive site-specific OE recognition training prior to participation in site activities.
2. Non-UXO-qualified personnel shall be escorted on site by UXO-qualified personnel in all areas within the EZ.
3. Non-UXO-qualified personnel shall not touch or disturb any object that could potentially be OE-related and shall immediately notify the nearest UXO-qualified person of the presence of the object.

6.14.19 Use of Products Containing Hazardous Materials

Due to the nature of some products used on site and the manner in which they will be used, it is not anticipated that there will be a potential for airborne exposure to the hazardous materials used on site. However, some products used have the potential for skin contact hazards and the handling of explosives presents a hazard to personnel involved with demolition operations. To help ensure personnel safety from hazardous materials, EODT personnel will follow the SWPs listed below.

1. The handling and transportation of explosive materials used for OE disposal will be conducted in strict compliance with the SOPs that will be maintained in the site office with the CSHP. These procedures present very specific guidelines for the handling, transportation, and use of demolition materials, and any personnel involved with demolition operations will as a matter of site training read these SOPs in detail and will follow their guidance implicitly.
2. To determine the chemical properties of the hazardous materials and the protective measures to be used, all site personnel who use products containing hazardous materials shall personally review the MSDS for each product used.
3. All products with airborne exposure hazards (i.e., gasoline and other fuels, spray paints, etc.) will be used outdoors or in well-ventilated areas, and personnel will stand upwind of the dispensing point when dispensing the product.
4. Personnel using or dispensing a product with a skin contact hazard will utilize protective gloves, as identified in paragraph 6.6 of this SSHP, when dispensing the material.
5. Only those personnel who have received appropriate HAZCOM training, as outlined in paragraph 6.14.12 of this SSHP, shall use a product containing hazardous materials.
6. Personnel shall immediately wash any affected area of the skin that accidentally comes in contact with a hazardous material identified as being a skin contact hazard.



6.14.20 Daily Safety Inspections

Daily inspections shall be conducted by the UXOSO to ensure that site operations and personnel are complying with this SSHP and other regulatory requirements. The results of these inspections shall be recorded in the Safety Log and documented on the EODT Safety Inspection and Audit Log form. Any site or operational discrepancies identified will be noted on this form, and the results of the inspection shall be reported to the SUXOS. On a weekly basis, the UXOSO shall conduct a compliance audit of the site. This audit will again be recorded in the Safety Log and documented on the EODT Safety Inspection and Audit Log form. All safety inspection and audit forms shall be maintained on site.

6.15 LOGS, REPORTS AND RECORD KEEPING

6.15.1 Safety log

The UXOSO shall maintain a Safety Log and shall be responsible for ensuring that all safety- and health-related activities and events are recorded in the log each day. At a minimum, the Safety Log should include: a reference to the conduct of the tailgate safety briefing; details of any accidents, injuries, illnesses, or near misses; details related to the conduct and outcome of internal and external audits; the reason for, and duration of, safety-related "stop work" orders; and any other issues pertaining to site or personnel safety or health.

6.15.2 Injury/illness/accident reports

In the event that a reportable accident/incident occurs at the job site, USACE Eng Form 3394 shall be completed and forwarded within two working days to the OSHM and CEHNC. In addition, if OSHA Form 200 needs to be completed, the UXOSO will forward the required information to the OSHM so the form may be completed as required. If a near miss occurs, or if an incident occurs that is not reportable to the USACE but involves personnel injury or property damage, the UXOSO shall investigate the incident and report the results of the investigation using the EODT Accident/Injury/Illness/Near Miss Report form. This form will be forwarded to the OSHM to be reviewed by the OSHM and PM.

6.15.3 Training log

The UXOSO is responsible for ensuring that all safety- and health-related training conducted is documented in the Training Log and/or on the appropriate training forms. This log will include the initial site-specific training conducted prior to the start of site activities, the Daily/Weekly Safety



Briefings, hazard-specific training, OE refresher/recognition training, emergency response exercises, etc. The UXOSO shall maintain this log and any associated training forms on site.

6.15.4 Visitor log

The UXOSO shall be responsible for maintaining the visitor log, which will be used to record the entry and exit of all visitors, including EODT; USACE visitors; or federal, state, or local officials who visit the site. This log shall utilize the EODT Site Visitors Log. All information required by the form will be completed by the site visitor and the UXOSO. No visitors will be allowed to enter the project site or WZs without completing the required information.

6.16 RADIOLOGICAL AND CWM

No detailed procedures for the remediation of radiological or CWM is required for this project. Available archival data has no indication that any radiological materials or CWM materials were ever tested or fired on this facility.

6.17 ACCIDENT PREVENTION

6.17.1 General

This purpose of this paragraph is to address all content requirements of the Accident Prevention Plan, as specified in EM 385-1-1, that is not otherwise addressed in this SSHP. Included in this section are: EODT's statement of safety and health policy; EODT's safety program and accident prevention goals; EODT's policies and procedures for safety violations and SSHP noncompliance; and EODT's plan for the prevention of alcohol and drug abuse.

6.17.2 Statement of Safety and Health Policy

It is the policy of EODT to maintain personnel exposures to hazardous OE and chemical, physical, or biological hazards at levels that are as low as reasonably achievable (ALARA). This ALARA policy is considered from the project-planning phase through to the project's completion and will apply to all phases of site operation. For each project and task, ALARA procedures will be developed by the OSHM, PM, and SUXOS, written into the site plans, approved by the client, and implemented during site operations. All site personnel will be required to adhere to the established ALARA procedures and the ALARA procedures shall be reassessed and updated if the anticipated site conditions change during the course of the project. ALARA procedures include: the SWPs and engineering controls presented in this SSHP for hazard control; procedures for ensuring the proper training of personnel; use of good personal hygiene practices; and, when required, use of PPE.



6.17.3 EODT's CSHP and Accident Prevention Goals

The goal of EODT's CSHP is to provide the safety and health guidelines needed to ensure that EODT personnel are provided with a work environment that is free of uncontrolled, recognized safety and health hazards. It is also the goal of the EODT CSHP to comply with all federal, state, and local regulations and with client-specific safety and health requirements. During its 11 years, of operation, EODT has never experienced an OE-related accident and has never been cited for a regulatory noncompliance. This enviable safety and health record has been maintained through the following: 1) EODT's meticulous attention to identifying project safety and health hazards; 2) EODT's careful design, and effective implementation, of appropriate hazard control measures and procedures; and 3) the thorough knowledge and extensive experience of EODT's field personnel. For this project, the OSHM, PM, and SUXOS will be responsible for working closely with the CEHNC safety and health representatives and for ensuring the project-wide implementation of EODT's CSHP requirements to ensure the continuance of EODT's safety record and the achievement of the safety and health policies stated previously.

6.17.4 Non-compliance Policies and Procedures

6.17.4.1 General Requirements

As outlined previously in paragraph 6.2 of this SSHP, designated corporate and on-site personnel have been tasked with the overall responsibility of ensuring the safe and healthful conduct of site operations. Additionally, EODT has expended significant energy and resources toward the design and development of written programs and procedures used to safe guard site personnel from the hazards associated with this project. It is imperative that site personnel realize that their compliance with established safety and health procedures is of paramount importance in the prevention of accidents and emergencies that could compromise their safety and health, and also the well being of other site personnel, the environment, and the public. Since violations of the safety and health procedures and programs outlined in this SSHP can result in serious personal injury, illness or environmental insult, EODT has developed the policies and procedures presented below to resolve and remedy any occurrences of safety or health noncompliance with this SSHP.

6.17.4.2 Safety and Health Violations

It is the general policy of EODT that no personnel engage in any activity for which: 1) they are not properly trained; 2) the consequences of the activity are uncertain; or 3) the activity hazards have not been assessed. As deemed necessary, the SSHO may impose other prohibitions to ensure the



safe conduct of operations. The prohibitions presented below are strictly forbidden at any time, during any on-site operation, with violation of these possibly resulting in termination of employment.

- Horseplay or fighting
- Use of alcohol on site or during the period from mobilization to the site each day, until demobilization from the site each workday
- Illegal use of drugs (as defined in section 6.17.5 of this SSHP)
- Use of prescription or over-the-counter medications without prior approval of the SSHO
- Eating, drinking, or smoking in a WZ without prior approval of the SSHO
- Unnecessary sitting or kneeling on potentially contaminated surfaces
- Climbing on/over obstacles unless this approved by the SSHP or SSHO
- Starting or maintaining an open flame of any type unless authorized by the SSHO
- Use of equipment that has not been inspected and deemed safe for operation
- Entry into a work site without prior approval of the SUXOS
- Initiation of work without the presence of a buddy

6.17.4.3 Disciplinary Actions

If a CSHP or SSHP safety or health nonconformance occurs appropriate positive disciplinary action will be taken. In all cases where a potential violation has been reported, the SSHO will conduct an investigation to validate the report and to determine the severity of the violation. Violations may be divided into two categories: major and minor. An example of a minor violation is reporting to, or conducting, work without the prescribed Level D PPE. A major violation is any violation of the SSHP that could have resulted, or did result, in an accident involving personal injury or property damage. Table 6-11 outlines the disciplinary actions and procedures to be followed in the event that a non-compliance issue results from personnel actions.

6.17.4.4 Violation and Disciplinary Action Procedures

When a known or potential violation/noncompliance occurs, the procedures listed below, and those listed in Figure 6-2, the Disciplinary Action Flowchart, will be used to ensure impartial implementation of these actions.

1. An investigation of the incident will be carried out by the UXOSO to determine if a violation has in fact occurred.

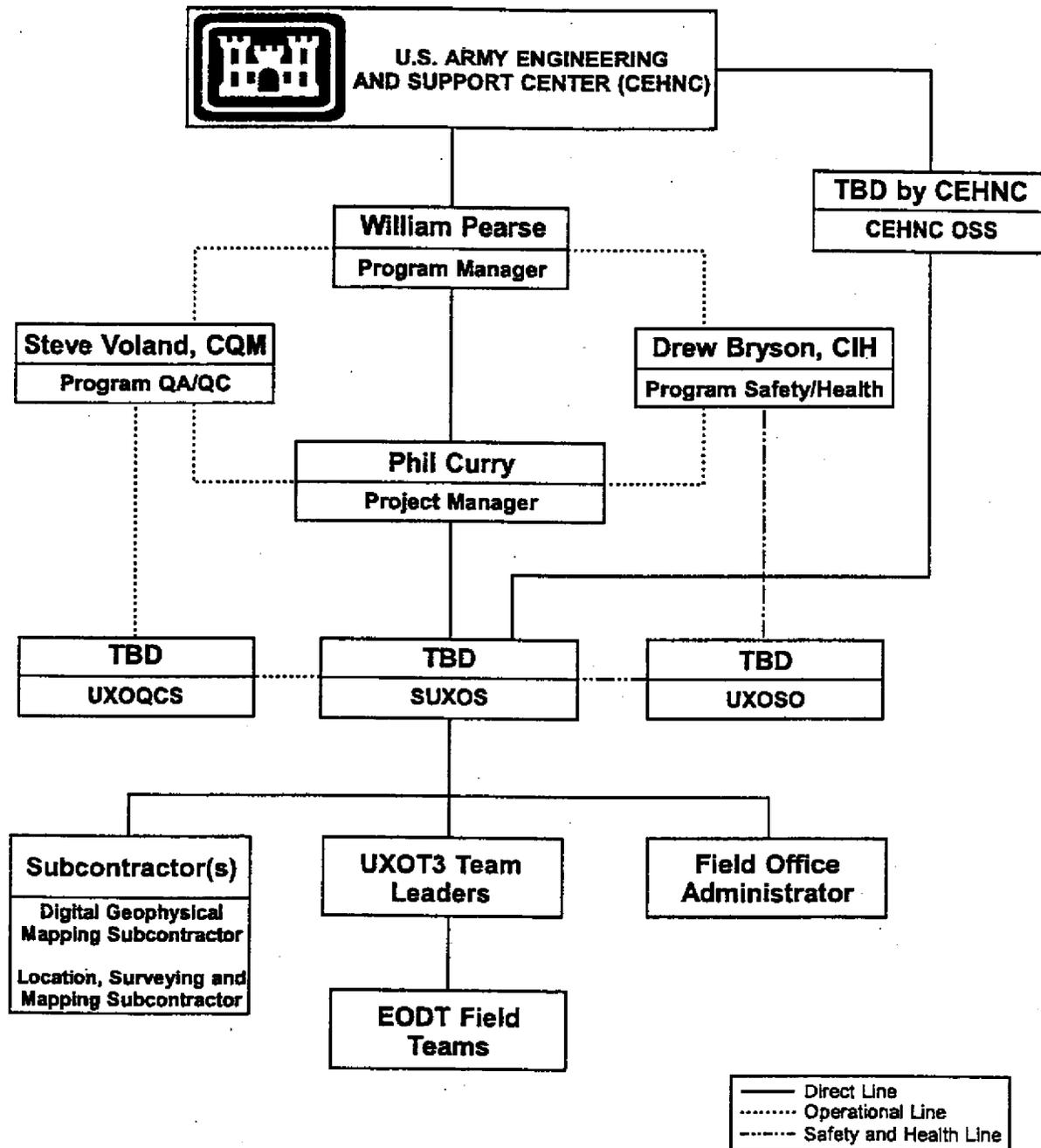


2. If the SSHO determines that a violation has occurred, a report of the violation will be generated by the UXOSO and submitted to the SUXOS and OSHM, along with the following:

TABLE 6-10: DISCIPLINARY ACTIONS FOR MINOR AND MAJOR VIOLATIONS

MINOR VIOLATION ISSUES	
First Offense:	A verbal warning will be given to the individual; the offense to be noted in individual's file and supervisor's project file; a discussion with the individual's supervisor or Team Leader will be conducted.
Second Offense:	Written reprimand by the SUXOS will be entered in individual's file; discussion with individual and individual's supervisor.
Third Offense:	Termination of employment by the SUXOS and notification to the PM.
MAJOR VIOLATION ISSUES	
Any Offense:	Minimum penalty for a major violation will consist of a written reprimand being entered in individual's file and a discussion between the individual and the SUXOS being conducted. Depending upon the severity of the violation, the SUXOS may temporarily dismiss the individual from the job site pending further investigation of the offense. If this occurs, the incident will immediately be reported to the PM and OSHM by the SSHO or SUXOS. Upon completion of a full investigation, the individual's employment may be terminated, if deemed appropriate through a joint decision of the OSHM, PM, and/or SUXOS.

FIGURE 6-2: VIOLATION AND DISCIPLINARY ACTIONS FLOW CHART



- The SSHO, in conjunction with the OSHM and SUXOS will determine if the violation is major or minor; and



- The SUXOS, in conjunction with the OSHM and the PM, will determine and implement the appropriate disciplinary action.

6.17.5 Substance Use and Abuse

6.17.5.1 Introduction

The Drug-Free Workplace Act of 1988 set as a goal the elimination of the effects of illegal drugs in the workplace. Due to the inherently hazardous nature of the work performed by EODT personnel, the importance of creating and maintaining a safe drug-free working environment is paramount. The performance of every employee must, at all times, support the company's mission to conduct site operations with a high level of productivity, reliability, judgment, and safety.

The management of EODT is thoroughly committed to providing a drug-free workplace for all employees. Drug and/or alcohol use and abuse are incompatible with EODT's high standards of performance, safety, and quality. As a term of employment, maintenance of these standards is expected of all employees, and all employees will refrain from the use, distribution, possession, manufacture, or dispensing of a controlled substance, and drug and/or alcohol abuse. Violation of this policy will result in administrative action to include the possible termination of employment.

6.17.5.2 Substance Use and Abuse Policy

Employee drug or substance use or abuse testing/screening conducted by EODT in support of this policy will be conducted at no expense to the employee, and, except for drug/substance use testing conducted for pre-employment, employees will receive reasonable compensation for the time required for participation in any drug or substance testing/screening. The drug or substance use for which EODT may conduct testing includes, but are not limited to: amphetamines, barbiturates, cocaine metabolites, methadone opiates phencyclidine (PCP), and ethyl alcohol. As a matter of policy, EODT will strictly implement and enforce the policies listed below.

1. No employee will report for work, or will work, impaired by any authorized or controlled substance, except with management's prior approval. Such approval will be limited to lawful medications, based strictly on an assessment of the employee's ability to perform their regular or other assigned duties safely and efficiently.
2. No employee will use any alcohol or controlled substance that could result in impaired performance, except with the knowledge and approval of the OSHM, SUXOS, or SSHO.
3. Applicants for employment are subject to substance abuse screening as part of their baseline or pre-assignment physical examinations. Refusal to submit to such screening will disqualify an applicant from employment.



4. All EODT employees are subject to substance abuse screening at any time as directed by the OSHM or on a random, nondiscriminatory basis. Refusal to submit to such screening will result in removal from the project site and/or termination of employment. Substance use or abuse screening may be conducted in those circumstances listed below:
 - Whenever there is reasonable evidence to suspect any employee has reported to work in an impaired condition or is working impaired
 - When an employee is involved in either a job-related accident or job-related incident involving the apparent use or abuse of any substance listed in this section.

6.17.5.3 Prescription Medications

EODT project personnel may possess and use prescription medications and "over-the-counter" medications provided that all of the following apply:

1. The prescription medication has been prescribed by an authorized medical practitioner for the current use (within the past 12 months) of the employee in possession of the medication, and the medication is in its original container with a valid pharmacy label which includes the employee's name and the physician's name.
2. The employee does not consume the prescribed, or over-the-counter, medication in quantities greater than, or more frequently than that prescribed by the container label.
3. Employees in possession of prescribed medications shall not allow any other person to consume any amount of their prescribed medication.
4. In the event that the prescribed medication could cause adverse side effects, or where the medication indicates warnings relevant to side effects affecting the operation of equipment or machinery, the employee shall inform the SUXOS and/or SSHO prior to engaging in project operations while under the influence of the medication (i.e., having taken the medication within the past 12 hours).

While the on-site, use of prescription and over-the-counter medications is authorized, under the requirements listed above. EODT reserves the right to have a licensed physician determine if the employee's use of the medication could adversely affect the individual or could increase the potential for injury or illness to the employee or other site personnel. If consumption of the medication could lead to adverse safety or health effects, the OSHM may, on the advice of the licensed physician, limit or suspend the employee's work activities for as long as the licensed physician indicates that the medication may adversely affect the employee. Any employee who has been limited or suspended from work activities may seek from the prescribing physician a substitute medication that will not adversely effect the potential for injury or illness to the



employee or other site personnel. If a suitable substitute can be prescribed, and is approved, the OSHM may lift the work activity suspension or limitation.

6.17.5.4 Suspicion Inspections and Testing

For the purposes of ensuring compliance with the prohibition against the unauthorized possession of controlled substances, employees will be subject to random and reasonable suspicion inspections and testing. An employee's company clothing, locker, closet, work area, desk files, company motor vehicle, and similar areas are subject to inspection. Similarly, an employee's privately owned vehicle, lunch box, and like containers are subject to such inspections when brought to any work site. At no time will an employee be physically touched during an inspection, and only outer clothing will be required to be removed for inspection or search. No person or property search (except for searches of EODT-owned, rented, or leased properties), urine drug test, or Breathalyzer test will be conducted without the employee's consent. Refusal to submit to a legal inspection, or request for testing, will result in employee removal from participation in site activities until further inspection or testing can determine the potential for prohibited drug or substance use or abuse.

6.17.5.5 Drug Convictions

Any employee convicted of violating a criminal drug or alcohol statute will report in writing the facts surrounding the conviction and sentence to their immediate supervisor within five calendar days of the conviction. The supervisor will forward the written results immediately to the OSHM and PM, via the supervisory chain, and a written report of the conviction will be made within ten calendar days to all government agencies with which the company has contracts. Upon notification of conviction, the OSHM, PM, and SUXOS will review the report and will, within thirty days after being informed, determine the disciplinary action to be taken. The disciplinary action taken may range from termination of employment to mandatory assignment to a rehabilitation program.

6.17.5.6 Treatment for Drug and Substance Use

EODT will encourage affected individuals to seek medical help voluntarily at an early stage and will assist supervisors in dealing with associated problems related to work performance. Additionally, supervisors and fellow employees will be discouraged from "covering up" for the affected individual and may face disciplinary action for doing so. Any employee, at own expense, who feels that he/she may have an alcohol or other drug problem, and voluntarily seeks the advice and help of a private physician or any agency in this field, may obtain medical treatment, in the



form of rehabilitation therapy. An employee may be mandatorily referred by EODT to a regional health center, or other type of medical facility, for medical help because of deteriorating job performance or excessive absenteeism associated with abuse of alcohol or drugs. Failure to follow prescribed medical treatment or to improve performance to an acceptable level will be justification for termination of employment on the same basis as any other employee whose work performance is unsatisfactory.

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CHAPTER 7: LOCATION SURVEY AND MAPPING PLAN

7.1 GENERAL

EODT shall perform a visual survey and create a map of each area to include the boundary and any significant geophysical object. To the maximum extent possible, EODT will use drawings, plans, and maps provided by CEHNC. Each grid will be uniquely numbered and identified on the map/drawing and the coordinate shown to the closest one foot. The southwestern corner stake of each grid, i.e., grid 001, will be marked using a wooden stake. All other corners will be marked using wooden stakes.

7.2 UXO SAFETY PROVISIONS

During all field and intrusive operations UXO personnel shall accompany the survey crew. The UXO person(s) shall perform a visual UXO survey for surface ordnance prior to the survey crew entering the area. The UXO person will perform a magnetometer survey of each intrusive activity site to ensure that the survey/staking point is free of anomalies prior to the survey crew setting monuments, driving stakes, or establishing other points.

7.3 CONTROL POINTS

Existing permanent monuments will be used. No new permanent monuments will be required.

7.3.1 Accuracy

A tabulated list of all control points and monuments showing their final adjusted coordinates and respective elevations (to the nearest 0.01 foot) established and/or used for survey will be generated. A tabulated list of each individual boundary corner and each grid corner shall also be provided showing the adjusted coordinates to the nearest one foot.

7.3.2 Monument Caps

N/A

7.3.3 Plotting

All control points recovered and/or established on the former Benicia Arsenal shall be plotted at the appropriate coordinate point on a reproducible (mylar) plain metric or topographic map.



7.3.4 Description Cards

A "Report on Establishment of Survey Mark" (Description Card) will be generated for each new permanent control monument established and/or used for surveying. In addition to the name and number of a monument, the cards shall contain the adjusted coordinates (to the nearest 1 foot and 0.01 foot), a written description for locating each monument from a well-known and easily identified point, and a sketch showing how to locate the monument.

7.4 MAPPING

All final mapping of the areas being investigated shall be created using Computer-Aided Design and Drafting (CADD) software. Mapping deliverables (two-dimensional design files) shall be in Microstation 5.0 format (or a format approved by the Government), and submitted on CD-ROM. Site maps plotted from these design files shall be provided on standard A-1 size reproducible (mylar) which are 33.1 inches x 23.4 inches in size. The maps shall be provided at a scale no smaller than 1 inch = 400 feet (1:2400), referenced to the North American Datum of 1983 (NAD83). The location, identification, and coordinates of all control points, boundary corners, grid corners, and corners of the concrete pads recovered and/or established at each site shall be plotted on the reproducible (mylar) maps. Each control point shall be identified on the map by its name or number and the final adjusted coordinate and elevation (to the nearest 0.01 foot). Each map shall include a grid north, and magnetic north arrow with the differences between them shown in minutes and seconds. Grid lines or tick marks in feet and at systematic intervals shall be shown with their grid values on the edge of the map. Each map shall display a legend, which shows the standard National Geodetic Standard (NGS) symbols used for mapping, a map index which shows the site in relationship to all other sites within the boundary lines of the project area, a border, and a standard Corps of Engineers (COE) title block.

7.5 DIGITAL DATA AND COMPUTER REQUIREMENTS

7.5.1 Design File Requirements

Maps shall be drawn on 841mm by 594mm (standard metric A-1 size drawing) reproducible mylar drawings generated by the CADD system. One original Mylar and five blue line prints of each final map, plus two copies of the digital data shall be delivered to CEHNC.



7.5.2 Survey/Mapping Data

Location survey and mapping shall be performed in accordance with the basic contract. The contractor shall perform all location surveys and mapping required establishing boundaries of the project site areas as required supporting the project. The contractor shall locate and map all the corners of individual grids (or other size as deemed appropriate for the conditions of this site), which are within the project site areas. The project site area shall be shown on the final drawing and plotted on the drawing based on NAD83.

7.5.3 GIS Incorporation

The product of this work will be provided in Microstation and Intergraph MGE GIS as needed for compatibility with the CEHN graphics system.

7.5.4 Computer Files

See Section C of the Basic Contract. As a minimum, all computer files, maps, and figures will be compatible with the Arc Info and will be in the correct format and structure to meet the TSSDS. This SOW requires three (3) copies of all tapes, floppy disks, or CD-ROM disks.

7.6 LS&M SUBMITTALS

Using the Trimble 4700 GPS system, this system is capable of sub-meter accuracy.

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CHAPTER 8: WORK, DATA, AND COST MANAGEMENT PLAN

8.1 PROJECT MANAGEMENT APPROACH

8.1.1 General

The purpose of this Work Data and Cost Management Plan (WDCMP) is to ensure the effective management of allocated funds, manpower, and equipment. All work will be accomplished in the order set forth in Task Order 0019. This WDCMP describes the organizational structure EODT will use to manage the project, the sequence in which operations will be performed, and the projected costs specified at operational milestones.

8.2 PROJECT ORGANIZATION

EODT has evaluated the work requirements for this Task Order and has developed a comprehensive approach for meeting the objectives as described in the SOW. This approach provides a phased structure for performance of the work in order to achieve optimal results. The goals and objectives of each operational task and its specific manpower requirements are specified in Chapter 2 of this WP.

8.2.1 EODT Personnel Management Responsibilities

Effective management is essential for delivery of a quality product. EODT is committed to providing a management structure that ensures quality and is tailored to the operational requirements of the project. The overall and on-site safety management structure that EODT will utilize during the execution of this ORA is presented in Figure 6-1 of Chapter 6 in this WP. This structure provides an appropriate level of management and oversight of safety and quality for the project. Additionally, the management structure ensures that the work performed will be executed in an efficient, safe, and effective manner.

8.3 PROJECT WORK SCHEDULE

EODT has prepared an initial project schedule for the work associated with this Task Order. The schedule identifies the individual activities associated with the project, the duration of activities, the sequence in which the work will be performed, and a projected start and finish date for accomplishing the work. This schedule is based on a forty-hour workweek, consisting of four 10-hour days. Work schedules may vary depending upon site requirements and the time of year in

which the project is performed. A typical daily schedule is outlined in Table 8-1. The overall schedule for the removal action is outlined in Table 8-2.

TABLE 8-1: TYPICAL DAILY SCHEDULE

TIME	ACTIVITY	LOCATION
0600-0630	Tailgate Safety & Operations Briefing Equipment Load Out	Vehicle Tailgate on location
0630-0830	Conduct Field Operations	Assigned Work Areas
0830-0845	Morning Break	On location
0845-1045	Conduct Field Operations	Assigned Work Areas
1045-1115	Lunch	On location
1115-1315	Conduct Field Operations	Assigned Work Areas
1315-1330	Afternoon Break	On location
1330-1600	Conduct Field Operations	Assigned Work Areas
1600-1615	Stop Operations/Return to SUXOS Area	On location
1615-1630	Clean and Store Equipment	Vehicle Tailgate

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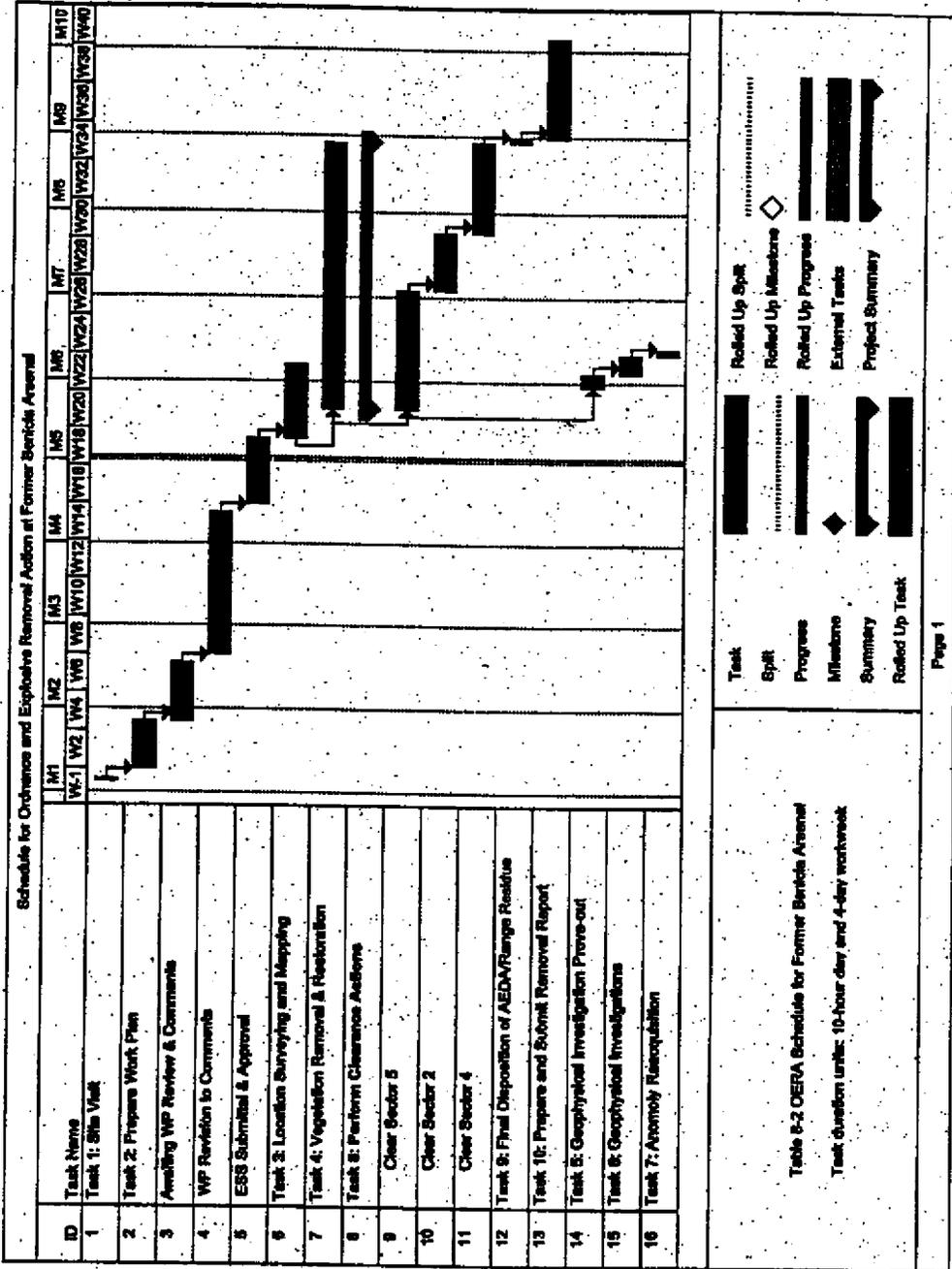


Table B-2 CERCLA Schedule for Former Benicia Arsenal

Task duration units: 10-hour day and 4-day workweek

Schedule for Ordnance and Explosive Removal Action at Former Benicia Arsenal												
ID	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Task Name	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
17	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
18												
19												
20												

Task	Roll Up Split	Roll Up Milestone
Split	Roll Up Milestone	Roll Up Progress
Progress	External Task	Project Summary
Milestone	Roll Up Task	
Summary		
Roll Up Task		

Table 4-2 OEPA Schedule for Former Benicia Arsenal
Task duration units: 10-hour day and 4-day workweek

Page 2



8.3.1 Manpower Requirements

EODT has structured its manpower requirements to meet the operational requirement of this task order. This structure was designed to minimize associated costs (i.e., travel and per-diem) and to provide an effective blend of technical talents and skills for executing the work associated with this task order. Additionally, EODT selected the listed labor categories to ensure those team flexibility criteria and production rates could be met. A detailed list of manpower requirements is contained in Table 8-3.

TABLE 8-3: TEAM COMPOSITION

TEAM	LABOR CATEGORY	QUANTITY
Pre-Mobilization Team Site set-up/Survey/Grid layout	SUXOS	1
	UXOSO	1
	UXOQCS	1
	UXOT2	1
Pre-Mobilization Team Total		4
Clearance Team	SUXOS	1
	UXOSO	1
	UXOQCS	1
	UXOT3	2
	UXOT3	9
	FOA	1
Clearance Team Total		15
Close-out Team	SUXOS	1
	UXOSO	1
	UXOQCS	1
	UXOT2	1
Close-out Team Total		4



8.4 EODT PERSONNEL RESPONSIBILITIES

The following paragraphs describe the specific responsibilities of the EODT personnel shown on the project organizational chart. All EODT personnel assigned to this project meet the CEHNC training and experience requirements for the position to which they are assigned. In addition to the project management responsibilities presented below, additional QC and safety responsibilities have been given to specific key personnel as defined in this WP and the SSHP presented in Chapter 6. Resumes for key EODT personnel are presented in Appendix E of this WP.

8.4.1 Project Manager

Mr. Phillip R. Curry is the Project Manager for this project. He has substantial experience in the management of USACE projects with over 20 years EOD and UXO experience. As the PM for this project, Mr. Curry will have the following management responsibilities:

- Managing the funding, manpower, and equipment necessary to conduct site operations
- Acting as the point of contact for CEHNC project personnel, and communicating with the CEHNC through the CEHNC PM
- Overseeing the overall performance of all EODT individuals assigned to the project
- Reviewing the SOW and ensuring that necessary elements are addressed in project plans.
- Coordinating all contract and subcontract work and controlling contractual costs and schedules

8.4.2 Senior UXO Supervisor

The SUXOS will be responsible for the daily supervision of all site activities, to include the following:

- Managing the EODT on-site manpower and equipment necessary to conduct site operations
- Detecting and identifying any problem area, and coordinating with the EODT PM to institute corrective measures
- Ensuring that all site activities are conducted according to this WP and relevant CEHNC regulations
- Acting as the lead technical consultant for all on-site OE related matters



8.4.3 Occupational Safety and Health Manager

Mr. Andrew Bryson is the EODT OSHM. He is a board certified CIH with over eight years of industrial hygiene, safety, and hazardous waste experience, including over five years of experience working on projects dealing with OE contamination. During the performance of this project, Mr. Bryson will provide occupational safety and health management duties, which are presented in detail in the SSHP found in Chapter 6 of this WP.

8.4.4 UXO Safety Officer

The UXOSO will be responsible for the operational items listed below, as well as the safety and health responsibilities listed in Chapter 2 of the SSHP.

- Issuing and/or approving "Stop Work" orders for safety and health reasons
- Identifying and evaluating any known or potential safety problems that may interfere with or interrupt site operations and endanger site personnel
- Consulting with the SUXOS on identifying and implementing of any necessary safety-related corrective actions
- Coordinating with the SUXOS for the implementation of the safety requirements in the SSHP
- Ensuring that all site activities are conducted LAW this WP and relevant Federal, state and local regulations

8.5 COST CONTROL

EODT has an approved Purchase Order (PO) system that requires the PM/SUXOS to submit a PO request for any expenditure for a single item in excess of \$25.00. In addition, the PM/SUXOS is given a copy of the approved spreadsheet specified by contract line item number (CLIN). Expenditures approved by the PM/SUXOS must remain within the line item totals or the PM/SUXOS must seek approval to exceed the amount.

8.5.1 Equipment

The Material Handling Specialist is responsible for providing the equipment for the former Benicia Arsenal project. He cannot provide any item out of inventory or purchase anything without the PM's approval.



8.5.2 Labor Hours

The PM approves all hours charged to the project by all field and corporate office personnel. This ensures no unauthorized hours are charged to the former Benicia Arsenal project and an accurate expenditure can be tracked.

8.6 COST TRACKING

EODT uses Microsoft Project 98 to track costs on all projects. On a daily basis, the PM forwards the hours expended for the previous day to include any expenditures not costed or anticipated. These figures are entered into Microsoft Project 98 and compared to the anticipated daily expenditures. An accurate daily cost can be tracked in this manner and the 85% spend threshold accurately anticipated. In addition, any additional costs by task can be identified as they occur and appropriate measures taken to either correct the negatives or incorporate the positives.

8.6.1 Coordination

It is imperative that an open line of communication is implemented and maintained between Robert Nore, the CEHNC PM; Phil Curry, the EODT PM; and the EODT SUXOS. This is essential in the accurate tracking of costs, notification, and early implementation of corrective action.

8.7 CONSUMABLE SUPPLIES

Consumable supplies consist of pin flags, twine, wooden stakes, etc. A list of those items included in EODT's overhead and not directly chargeable to the project, including exceptions and unallowable charges, are presented in Table 9-4 of Chapter 9.

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CHAPTER 9: PROPERTY MANAGEMENT PLAN (PMP)

9.1 GENERAL

EODT is directly responsible and accountable for all government furnished equipment (GFE) and will establish and implement a system to control, protect, preserve, and maintain all GFE utilized in support of this project LAW Federal Acquisition Regulation (FAR) Part 45.5. This PMP prescribes the procedures EODT will use to maintain accountability of its equipment and any GFE. For purposes of this plan, the term equipment will apply to both EODT owned equipment and the equipment provided by the Government.

9.2 PROPERTY MANAGEMENT OBJECTIVES

The objective of this plan is to ensure that equipment is acquired, tracked, utilized, maintained, secured, and, if applicable, disposed of properly. This plan shall be applied to all field equipment.

9.3 RESPONSIBILITIES

EODT is responsible for ensuring that its work force at the former Benicia Arsenal is furnished with the requisite equipment needed to accomplish the tasks detailed in the SOW. It is imperative that equipment is provided in a timely manner and that it arrives at the work site in functional condition. In addition to this corporate responsibility, the management, supervisors, and workers on site have specific responsibilities regarding the use, maintenance, and storage of equipment.

9.3.1 SUXOS

The SUXOS has overall responsibility for ensuring that equipment requirements for the OERA are specified in sufficient time to allow EODT and/or the Government to acquire, process, and ship the required materials to the site. The SUXOS is also responsible for maintaining accountability of issued equipment and ensuring that this equipment is maintained in a state of operational readiness.

9.3.2 Individual

All EODT employees are responsible for operating and maintaining equipment in a reasonable and prudent manner. This responsibility includes using the appropriate equipment for the assigned task; using equipment for its intended purpose and in its intended manner; daily cleaning of the equipment; properly storing and securing the equipment at the end of the day; and promptly reporting any equipment failures or breakages.

9.3.3 Contract Administrator

The EODT Contract Administrator (CA) is responsible for acquiring the specified equipment IAW the applicable FAR and EODT's purchasing policies. The CA will coordinate the acquisition of required equipment with the EODT PM and SUXOS.

9.4 EQUIPMENT CATEGORIES

EODT categorizes equipment based on its source of supply and its physical characteristics. All equipment, regardless of category, will be maintained and utilized in an appropriate manner.

9.4.1 Non-expendable Equipment

Non-expendable equipment consists of those items that are not consumed or do not lose their identity during use. Examples of this type of equipment are desks, computers, magnetometers, etc.

9.4.2 Expendable Equipment

Expendable equipment is defined as those items that are consumed during normal use or are discarded after use. This type of equipment includes paper products, fuels, string, explosives and other consumable items.

9.4.3 Government Equipment

Government equipment, as defined in FAR Part 45.101, is all property owned by or leased to the Government or acquired by the Government under the terms of the contract. It includes both Government furnished property and contractor-acquired property. Contractor-acquired property (CAP) is equipment acquired or otherwise provided by the contractor for performing a contract and to which the Government has title.

9.5 EQUIPMENT ACQUISITION

9.5.1 Quotation Procedures

The SUXOS will be responsible for preparing quantity and specification requirements for each piece of equipment to be used on the project. These requirements will be forwarded to the CA, who is responsible for equipment acquisition. The CA will obtain three quotes and perform a lease/purchase analysis for each item not available from government sources. All acquisitions will be done in compliance with the applicable FAR and EODT purchasing policies.



9.5.2 Lease Vehicles

The maximum number of vehicles allowed for this project is based on two vehicles per five-man team and two four-wheel drive pickup trucks.

9.5.3 Receiving and Records

All equipment will be accounted for using an EODT Property Control and Tracking Card. Upon receipt of equipment, the information from the shipping documents and/or purchase orders will be transcribed to the Tracking Card. The quantities and type appearing on the shipping or purchase documents will be compared with the actual items received, and any discrepancies will be noted and resolved. The Tracking Card will reflect the actual quantity received.

9.5.4 Identification

All non-expendable government equipment will be clearly marked with an identifying number (e.g., CEHNC-FS-000). Property received directly from CEHNC should already be marked but the UXOQCS will ensure that equipment received is actually marked. When directed to procure CAP, EODT will contact the CEHNC Property Section and obtain an identifying number for the new piece of equipment. Upon receipt of the equipment, EODT will promptly mark the equipment with the number provided by the CEHNC Property Section.

9.5.5 Movement

The movement of all GFE or CAP will be tracked throughout the course of the project. Both on- and off-site movements are tracked with the EODT Property Control and Tracking Card since this form has data fields for recording to whom the equipment is issued on site, the date, place, and manner of off-site transfer.

9.5.6 Physical Inventory

On a weekly basis, the SUXOS will ensure that all equipment and property is physically inventoried and visually inspected. On a monthly basis, a copy of the physical inventory of GFE and CAP will be reported to the CEHNC Property Office.

9.5.7 Utilization

In the event that facilities or special test equipment is furnished by the government to EODT, affected items will be inventoried, tracked and maintained IAW FAR Part 45.5 and identified as such.



9.5.8 Maintenance

EODT will maintain all equipment in its possession in functional condition. This includes performance of routine maintenance and service. In the event an equipment item requires maintenance beyond the capability of on-site personnel, EODT will coordinate with CEHNC personnel to determine if the equipment should be sent to a maintenance facility, discarded, or returned to the CEHNC property section. Equipment turned into external agencies for repair or service will be accounted for using shipping invoices and/or repair tags. All equipment will be maintained IAW the quality control procedures outlined in Chapter 11 of this WP.

9.6 INDIRECT CONSUMABLE SUPPLIES

The items listed in Table 9-1 are charged to EODT overhead.

TABLE 9-1: FIELD CONSUMABLES

DESCRIPTION	QUANTITY	REMARKS
Electrical tape	8 rolls	
Gloves	20 pairs	work, leather
Log books	5 each	
Paper, towels	10 each package	
Tape - Duct	10 rolls	
Wet/handi wipes	10 containers	

9.7 PROJECT REQUIRED EQUIPMENT AND SUPPLIES

The services, equipment, and supplies presented in Tables 9-1, 9-2, and 9-3 will, as a minimum, be required for the performance of the SOW at the former Benicia Arsenal.



TABLE 9-2: FIELD EQUIPMENT

DESCRIPTION	QUANTITY	REMARKS
Barricades	4 each	Purchase
Battery Charger	1 each	Rental
Blood borne pathogen kit	4 each	1/vehicle Covered by EODT Overhead
Crew Cab 4x4	2 each	for teams Rental
Pickup 4x4	2 each	for SUXOS and Safety/QC Rental
Bucket, plastic	8 each	five gallon Purchase
Burn kit w/burn blanket	4 each	1/vehicle Covered by EODT Overhead
Secure Roll Off Container	1 each	Rental
Cellular telephone	3 each	Rental
Demolition kit	2 each	Rental
Explosive Day Box	2 each	Rental
Eye wash kit	4 each	1/Vehicle Covered by EODT Overhead
Fire extinguisher	4 each	1-10 A:B:C/vehicle Covered by EODT Overhead
First aid kit	4 each	1/vehicle Covered by EODT Overhead
Hydration backpack	14 each	Camelback / Aquaduck Covered by EODT Overhead
Ice chest	4 each	Coleman Covered by EODT Overhead
Igloo drink cooler	4 each	5 gallon for water/Gatorade Covered by EODT Overhead
Magnetometer	10 each	Schonstedt 52 CX Rental
Port-A-John	2 each	Rental



OE Removal Action Work Plan
Former Benicia Arsenal, Benicia, CA

DESCRIPTION	QUANTITY	REMARKS
Radio, hand held	5 each	Rental
Safety glasses	20 pair	Covered by EODT Overhead
Snake leggings	14 sets	Covered by EODT Overhead
Stretcher	2 each	Covered by EODT Overhead
Tape	2 each	200 foot Purchase
Tool kit	4 each	one/vehicle Rental
Video Camera	1 each	Rental
Computer with Accessories	1 each	Rental
Cut-off saw with accessories	1 each	Rental
Mechanical Excavator	1 each	As required Rental
Power Brush Cutter & PPE	2 each	Rental
Radio Base Station	1 each	Rental
Site Trailer	1 each	Rental
Camera, Digital	1 each	Rental
Flags	3000	Purchase
Fax, Copy Machine	1 each	Rental



TABLE 9-3: EXPLOSIVES CONSUMABLES

DESCRIPTION	QUANTITY	NOTES
Detonating cord	As Required	80 grain
Electric detonators	As Required	No.8
Boosters	As Required	PETN
Perforators	As Required	19 gram

9.8 EQUIPMENT STORAGE PLAN

EODT equipment and GFE will be stored in a secure area. If space permits, each team will have a respective area to store their team's equipment. Equipment, both GFE and EODT, will be arranged in such a manner as to allow for visual inventory.

9.9 EQUIPMENT DISPOSITION PLAN

Upon completion of operations or when equipment is no longer needed, GFE will be returned to the CEHNC. Prior to returning property, a list of the property will be forwarded to the CEHNC Property Section. This list will be provided in sufficient time (normally 30 days in advance) for the Property Section to make a determination as to whether the equipment is to be returned to Huntsville or shipped to another work site. Property will be cleaned and properly packaged for return shipment. If an item being returned is unserviceable, it will be tagged indicating the shortcoming. At the time of shipment, the UXOQCS will complete the Property Control and Tracking Card for the equipment to indicate the date, place, and manner of final disposition.

9.10 QUARTERLY TRACKING LOG REPORT

The UXOQCS will conduct a quarterly inventory and compare the results of the inventory against the tracking log. Discrepancies will be recorded and brought to the attention of the SUXOS.

9.11 PROCEDURES FOR EQUIPMENT LOSS, DAMAGE OR DESTRUCTION

The PM/SUXOS will be notified when equipment is lost, damaged, or destroyed. If the lost, damaged, or destroyed equipment is essential to the job the CEHNC PM will be notified



immediately so replacements can be obtained. Additionally, the CEHNC property office will be notified. The PM/SUXOS will determine if negligence was a factor.

9.12 PROJECT REQUIRED EQUIPMENT AND SUPPLIES

The services, equipment and supplies presented in Tables 9-1, 9-2 and 9-3 will be required for the performance of the SOW at the former Benicia Arsenal. The equipment and supplies presented is not all-inclusive and may be adjusted as warranted by site conditions.

9.13 CONSUMABLE SUPPLIES

Consumable supplies consist of pin flags, twine, wooden stakes, etc. A list of those items included in EODT's overhead and not directly chargeable to the project, including exceptions and unallowable charges, are presented in Table 9-4.

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TABLE 9-4: CONSUMABLES AND UNALLOWABLE CHARGES

EMPLOYEE CONSUMABLES AND/OR PERSONAL EQUIPMENT	
The following items are considered examples of employee consumables and/or personal equipment and, as such, are not allowable direct costs with the exception noted below:	
Goggles	Clocks
Safety Equipment	Boots
Shoes	Cups
Gloves	Work Uniforms
Bug/Insect Repellent	Office Supplies
Wet Wipes or pre-moistened towelettes	Uniform Maintenance
Paper Towels	Laundry Items
Toilet Paper	Flashlights
Bottled Water	Batteries
Rain Suits	Shovels/Rakes
Whistles/Air Horns	Water Coolers
Sun screen	Keys
Poison Ivy/Oak Protection & Cleanser	Paint
Under EODT's approved DCAA accounting system, certain items similar to those listed above may be charged as direct costs. For example, equipment and supplies, which are required by the unusual or unique characteristics of a particular task, site, or locale (or which must be purchased in unusual quantities because of the above factors) may be charged as direct costs.	
UNALLOWABLE CHARGES (direct and indirect):	
Coffee	Ice
Tea	Shaving Equipment/Supplies
Gatorade or Sports Beverage	Soft Drinks and Milk
Sugar	Coffee Creamer



CHAPTER 10: SAMPLING AND ANALYSIS PLAN

(Not required for this project)

CHAPTER 11: QUALITY CONTROL PLAN

11.1 INTRODUCTION

This QCP, as a component of the EODT Quality Program (QP), provides the procedures for controlling and measuring the quality of all work performed during site activities at the former Benicia Arsenal. All QC activities will be performed and documented LAW applicable professional and technical standards and the CEHNC requirements. This site specific QCP provides procedures for:

- Testing, response checking, or calibrating equipment used to perform work tasks
- Determining the effectiveness of work performed
- Inspecting the maintenance and accuracy of site records
- Determining compliance with this plan and all other elements of the WP

11.2 DEFINITIONS

11.2.1 Accuracy

Accuracy is the degree of agreement of a measurement or the average of several measurements with an accepted reference or "true" value; it is a measure of bias in the system.

11.2.2 Precision

Precision is the degree of mutual agreement among individual measurements of a given parameter under the same conditions.

11.2.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under normal conditions.

11.2.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Careful choice and use of appropriate methods in the field helps to ensure that samples are representative. This is relatively easy with water or air samples, given that the components of these media are homogeneously dispersed. In contrast, soil and sediment

contaminants are unlikely to be evenly distributed. It is important for the sampler and analyst to exercise good judgment when collecting and analyzing a sample.

11.2.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another.

11.3 QUALITY PROGRAM MANAGEMENT STRUCTURE

The following section describes the structure of the quality management team for EODT's operations at former Benicia Arsenal. Personnel were selected based on previous experience and their familiarity with the EODT QA/QC system.

11.3.1 QC Manager

Mr. Stephen C. Voland is the EODT QCM and has the ultimate responsibility for the EODT QC program. Mr. Voland reports directly to Mr. James Burger, President of EODT. The QCM's responsibilities include:

- Preparation of all QC policies and procedures
- Establishing guidelines to assist in the development of program, project, site, and task specific QC policies
- Reporting regularly to the President of EODT on the adequacy, status, and effectiveness of the QC program
- Conducting periodic field audits of the programs, projects, and sites and submitting a report of findings to the President with courtesy copies to the SUXOS and EODT's PM
- Training site QC Specialists in the performance of their duties

11.3.2 Site UXOQCS

The EODT site UXOQCS will have the responsibility and authority to enforce the site-specific QC plans and procedures. The UXOQCS's responsibilities include:

- Coordinating with the CEHNC QA representative to ensure that QC objectives appropriate to the project are set and all personnel are aware of these objectives
- Conducting daily QC audits of all site activities and recording the results from these inspections in the QC activity log
- Recommending and implementing actions to be taken in the event of a QC deviation to include stop work authority
- Reporting noncompliance with QC criteria to the EODT QCM and PM



- Stop work authority

11.4 CRITICAL ISSUES/ACTIVITIES

EODT has identified the issues/activities listed below as being critical to the delivery of a quality product. The paragraphs following this paragraph describe the QC criteria that EODT will apply to these critical issues/activities and the methods EODT will use to monitor quality.

11.4.1 Employee qualifications

Prior to an employee's initial assignment or any change in duties/assignment, the UXOQCS will physically review the employee's licenses, training records, and certificates to ensure that the employee is qualified to perform the duties to which they are being assigned. The SUXOS will maintain personnel files on each employee, to include copies of licenses, training records, and certificates of qualifications that support the employee's placement and position.

11.4.2 Employee training

Employee training is an integral part of producing high quality products. EODT conducts site-specific employee training prior to the start of operations and supplements this initial training, as necessary, throughout the remainder of the project. The UXOSO, SUXOS, and UXOQCS conduct training, and records of attendance are generated and maintained. At a minimum, EODT personnel receive the following types of training, as required by the specific tasks to which they are assigned:

- **OSHA:** Current certification IAW 29 CFR 1910-120(e)(f)
- **Safety:** Review of the SSHP with specific emphasis on the hazards known to exist on site, and those hazards that may be generated by site operations
- **Equipment Operators Training:** Tailored to the experience level of the operator and objectives of the project
- **Daily Safety Training:** Tailgate briefings outlining the day's activities, unique hazards, and safety precautions, and other operational issues related to the project
- **Weekly Safety Meetings:** On the first workday of each week, a topic will be selected and elaborated on at the tailgate briefings
- **Visitor Training:** All site visitors shall receive general and site-specific training as a portion of their in briefing



11.4.3 Publications

EODT has conducted a technical review of the SOW and all pertinent data, and compiled a list of required publications to be maintained at the site. In addition to this list, EODT 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 will check to ensure that site publications are present and in good repair. Results of this inspection will be recorded and reported. The currently identified publications include:

- Copy of Task Order 0019
- OSHA, 29 CFR 1910, Occupational Safety and Health Standards
- CEHNC EM 385-1-1, Safety and Health Requirements Manual
- Applicable EODT SOPs
- Material Safety Data Sheets (MSDS) for hazardous substance used on site
- 385-5
- Work Plan (WP)
- Explosive Safety Submission (ESS)

11.4.4 Equipment Calibration and Tests

Measurement equipment utilized on site, e.g., sampling pumps, magnetometers, real-time monitors, etc., will be checked for operational reliability and calibration IAW the manufacturer's specifications. EODT has reviewed the equipment requirements of this task order and identified the equipment listed below as requiring daily tests and/or calibration. Calibration/testing of these instruments will be accomplished as follows:

1. **Communications Equipment:** Prior to commencing operations each morning, radios and cellular phones will be checked. Radios will be function checked to ensure batteries are charged and the radio is operational. Cellular phones will be checked to ensure they are operational. If communications are lost, either between teams and the command post or off site to emergency services, work will cease until communications are restored.
2. **Sound level meter:** The sound level meter will be calibrated, prior to use, IAW the manufacturer's recommendations and procedures.
3. **Galvanometer:** Prior to demolition operations, the galvanometer will be checked by placing a metal object across the two terminal posts and observing the LED readout, which should indicate the number 1 . Any other reading may indicate a defective instrument, at

which time the manufacturer's suggested checks will be followed. If there is no reading, the battery must be replaced, after which the continuity check will be repeated.

4. **Blasting machine:** Prior to demolition operations, the blasting machine is checked IAW the manufacturer's suggested sequence.
5. **Magnetometers:** Prior to use, all handheld magnetometers will be checked and/or calibrated against a known metallic anomaly. Magnetometers will be checked using the established geophysical test plot. The purpose of this test/calibration is to ensure that the instruments are operating properly and to appropriately adjust the sensitivity level of the instruments. Magnetometers will be checked against the known source to ensure they are operational and capable of detecting ferrous objects. Each day the operator will perform this test prior to placing the instrument into operation.

All equipment used at the former Benicia Arsenal will be dedicated solely to the project until the project is completed, or until it is no longer needed. If equipment field checks indicate that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service. The EODT SUXOS will be notified and a request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service immediately.

11.4.5 Maintenance Program

EODT has an aggressive maintenance program implemented as follows:

1. **Preventive Maintenance:** The assigned operator of each piece of equipment will perform scheduled, and when necessary, unscheduled, preventative maintenance to ensure the equipment is maintained in a satisfactory operating condition. Preventive maintenance consists of before, during and after operational checks and documentation of these activities, either in the operator's logbook or in the team leader's field logbook.
2. **Routine Repair and Adjustment:** Routine repair and adjustment is based on the manufacturer's schedule for adjustment, calibration or replacement. All equipment used on site will be maintained and submitted for routine repair and adjustment IAW the manufacturer's specifications.
3. **Emergency Repair:** Emergency repair includes any unscheduled repair. This type of repair will be conducted using manufacturer required replacement parts and procedures to ensure the continued integrity of the equipment.
4. **Included Equipment:** Equipment in the maintenance program will be checked as follows:

- a. **Radios/Cellular Phones:** Before-operation checks shall include verification of a complete battery charge and a communications check to ensure the unit is operating properly. During-operation checks shall include periodic checks to ensure battery charge remains adequate and a communications check once an hour for the radios and once a day for the cellular phone. After-operation maintenance shall include a communications check, cleaning, turning off, and placing in battery charger.
 - b. **Vehicles:** Before-operation checks shall include an operator general inspection of the entire unit to include fluid levels, safety equipment operation and tire condition. During-operation checks shall include frequent inspections of the dials and gauges and a tire inspection at breaks. After-operation checks shall include topping off of any fluids, which are low, a general cleaning, and a recheck of all safety-related equipment.
 - c. **Demolition Equipment:** Before-operation checks shall include a check of all batteries in the blasting machines and galvanometers. Some blasting machines do not contain batteries, so a check will be made to ensure they operate properly. During-operation checks shall include an inspection of the terminals and condition of the units. After-operation checks shall include a general cleaning and battery removal if applicable.
5. **Geophysical Survey Instruments:** Before-operations checks shall include battery insertion, the location of magnetic item/inert ordnance items at various depths and determining the standard indications. Items buried at the prescribed depths in the geophysical test grid will be used for morning magnetometer checks. If a magnetometer does not meet the standard, then it shall be calibrated/repared or replaced. During-operations checks shall include frequent checks to ensure the sensitivity level is on the designated setting. In addition, the operator will check batteries at breaks. After-operation checks shall include battery removal and cleaning.

11.4.6 Logs and Records

For all site work, field personnel will use bound log books with consecutively numbered pages. The field log books will be used to record the daily activities of the field team, provide sketch maps and locations of UXO's and other pertinent items, and to note any observations that might affect the quality of data. The field log books and site records will be utilized to record the data discussed below:

1. **Daily Journal:** The SUXOS will maintain the daily journal. This journal will provide a summary of all operations conducted to include information on weather conditions, problem areas, work plan modifications, injuries, start/stop times, tailgate safety briefs,



- equipment discrepancies, UXO/OE located, training conducted, visitors, and any additional items deemed appropriate.
2. **OE Records Management:** The UXOT3 will prepare individual records for each UXO location at former Benicia Arsenal. The OE records management SOP can be found on site. Each OE item will be given a unique identifying number to differentiate it from the others.
 3. **Safety Log Book:** The UXOSO will maintain this log. The log will be used to record all safety-related matters associated with the specific project such as: safety briefings/ meetings, including items covered and attendees; safety audits; near-misses/accidents incidents. It will include cause and corrective action taken; weather conditions; and any other matters encompassing safety.
 4. **Training Records:** The SUXOS will maintain training records for all site personnel. These records will contain training certificates, licenses, and other qualifying data for an individual's duty position.
 5. **Quality Control Log:** The UXOQCS will maintain this log and will record the performance and results of QC checks and audits as well as calibrations.
 6. **Visitor's Sign-in Sheet:** The SUXOS will maintain this log for all personnel that are not directly involved in the project site activities. This log will identify visitors by name, company, date, time in/out, and a contact phone number.
 7. **Photographic Record:** The SUXOS will maintain a photographic record to record all video recording and photographs taken to document work and/or site conditions. Photographs and videotapes will be marked with a unique identifying number relating back to the photographic log and will be maintained on file until the end of the project. Photographic negatives and duplicate copies of videotapes will be forwarded to the EODT corporate office in Lenoir City for safekeeping.
 8. **Site Maps:** The SUXOS will maintain working maps of the operating areas. These maps will be used to document OE findings, task progression, and other pertinent activities and locations.
 9. **Log books and records will be inspected by the UXOQCS on a weekly basis.** These inspections will focus on the completeness, accuracy, and legibility of the entries and records: Results of these inspections will be forwarded to the SUXOS. The log keeper's immediate supervisor will review and initial in the log book concurrence with the log book entries on a daily basis.



11.4.6.1 Note

The log books are utilized to formulate the final report and serve as an "Official Document" in the event of any problem area addressed after the completion of the project. All log books will be maintained on file for a period of seven years after project completion. These logs may be digital and saved on disk.

11.4.7 Lessons Learned

Lessons learned will be captured, documented, and submitted to the government during the entire project. In the event of accidents, the UXOSO will perform this function. If the lesson learned will effect the job by making it better, cheaper, or faster, then the UXOQCS will gather this information and include with the weekly status report.

11.5 ORDNANCE VERIFICATION, ACCOUNTABILITY AND CONTROL

All OE items located will be positively identified by a qualified UXOT2 and the UXOT3. The UXOT2 and UXOT3 will also identify the condition of the item (i.e., misfire, unfired, dud) and associated hazards [high explosives (HE), fragmentation, white phosphorus, ejection, chemical, etc.]. The identification, condition, and associated hazards of all items will be verified by the UXOQCS, and will be responsible for maintaining the Ordnance Accountability Log, and the traceability of all ordnance items located LAW the UXO/OE Operations - Quality Control, Records management SOP, located in the site office.

11.6 QA/QC AUDITS AND SURVEILLANCE

As part of the QP, EODT will conduct both internal and external audits and surveillance at former Benicia Arsenal. This is to ensure that all procedures and protocols are being followed and that the resulting data is accurate and defensible. Field audits will concentrate on surface and subsurface sweep procedures, excavation operations, subcontractor geophysical operations, proper documentation, and checks of resulting data for completeness and accuracy within established QC limits.

11.7 QC INSPECTIONS

To ensure that quality work is conducted, QC inspections (QCIs) will be conducted according to the criteria specified in the following paragraphs. All inspections will be conducted by the responsible personnel and documented accordingly. The Geophysical subcontractor operations will



be closely monitored by the UXOQCS to ensure work plan compliance. The QC plan is given in Section 5.4.9 of this WP.

11.7.1 Daily QC Inspections

The UXOQCS will perform random, unscheduled audits of the various site activities to ensure that personnel accomplish all work and record keeping as specified in this WP. The UXOQCS will then submit a report of findings to the SUXOS and the PM. These QCIs shall include property accountability, UXO related tasks, equipment operator maintenance, PPE usage and WP compliance. The EODT QCI and Audit Log Form will be used for these QCIs and maintained on file with the SUXOS.

11.8 PASS/FAIL CRITERIA

A grid will fail a QC check if UXO, OE and OE-Scrap is found to the standards listed in paragraph 3.5.1.1 of the SOW (Project Performance Standards). Detection Requirements for Geophysical Mapping are as follows:

$\log(d) = 1.002 \log(\text{dia}) - 1.961$ where "d" is the actual depth to the top of the buried item, in meters and "dia" is the diameter of the minor axis of the munition, in millimeters. As stated in paragraph 3.5.1.3 of the SOW (Project Performance Standards)

Any grid that fails a QC must be re-swept. The QC will check at a minimum, 10 percent of each completed grid.

11.9 NON-CONFORMANCE/CORRECTIVE ACTION

Any non-conformance to contractual requirements will be documented and reported. Non-conformance includes:

- Delivery of items or services by EODT that do not meet the contractual requirements
- Errors made in following work instructions or improper work instructions
- Unforeseeable or unplanned circumstances that result in items or services that do not meet quality/contractual/technical requirements
- Technical modifications to the project by individuals that do not have the responsibility and authority
- Errors in craftsmanship and trade skills

Immediately upon receipt of a notice of non-conformance, the SUXOS will take the following corrective actions:



1. Identify the impact the non-conformance may have on other project activities
2. Identify and implement the actions required to bring the project/activity back into compliance
3. Identify and implement procedures to preclude recurrence of the non-conformance
4. Notify the Corporate Quality Manager and provide him with a copy of the CEHNC Form 948

11.10 PROJECT CORRESPONDENCE

All written and verbal (i.e., person-to-person or via telephone) correspondence will be documented and routed to the EODT PM. All written communications from the CEHNC or designee must be addressed to the EODT PM. Incoming written communications will be annotated with the date received. Telephone communications to field personnel must be logged by site personnel into the daily activity logs. Telephone communications to office personnel must be recorded on a Telephone Conversation/Correspondence Record form. Of critical importance is the documentation of activities that stop work or require a communication to, or from, CEHNC.

11.10.1 Task Order Correspondence

Correspondence concerning Task Order 0019 should be sent to:

- Mailing Address: EOD Technology, Inc.
2229 Old Highway 95
Lenoir City, Tennessee 37771

11.10.2 Project Manager Address

The EODT PM is Mr. Phil Curry. Mr. Curry can be contacted through the following:

- Mailing address: EOD Technology, Inc.
2229 Old Highway 95
Lenoir City, Tennessee 37771
- Telephone: 865/988-6063
- Facsimile: 865/988-6067
- Electronic mail: EODT@eodt.com

11.11 PROJECT RECORDS

Project records will be maintained in separate project files for each Task Order. Each project file will be maintained with the following categories:



Category	<u>File Content</u>
A1	Internal correspondence
A2	Outgoing correspondence
A3	Incoming correspondence
A4	Outgoing to CEHNC
A5	Incoming from CEHNC
A6	Chronological communications log
B	Not used
C	Original typed copies of the Removal Report
D	Copies of the Task Order, cost estimates for any additional work to be performed under the Task Order, copy of subcontractor work agreement or contract, copies of cost quotations from suppliers and subcontractors
E	Original Field Activity Daily Logs and subcontractor daily field log bound books, Ordnance Accountability Log, Working Map(s), and equipment status log
F	Not used
G	Not used
H	Copies of Removal Report
I	Original photographic log and negatives (prints need not be maintained)
J	Not used
K	Not used
L	Not used
N	Not used
O	Check prints of drawings submitted with the Removal Report
P	Not used
Q	QC Audits, Surveillance, and Nonconformance Reports
R	Site-specific Safety and Health Records including Safety meeting documents
S	Field administration records including subcontractor and contractor work time hours, expense reports, travel mileage, and time
T-Z	Not used



11.12 PROJECT DELIVERABLES

The deliverables listed in Table 11-1 are to be submitted as indicated on or before the required due date. Status Reports and Telephone/Conversation Reports are due monthly, with the originals of each of these reports sent within 10 days of the end of the reporting period by normal mail to:

- US Army Engineering and Support Center, Huntsville
ATTN: CEHNC-OE (Mr. Bob Nore)
P. O. Box 1600
Huntsville, Alabama 35807-4301

11.12.1 Distribution

EODT shall furnish copies of the plans and reports in the quantities indicated to each addressee listed below. EODT shall use express mail services for delivering these plans and reports. Following each submission, comments generated as a result of their review shall be incorporated into the plan/report. All comments will be sent to Bob Nore, the CEHNC Project Manager, for consolidation prior to incorporation, and all comments should be referenced. The following addresses shall be used in mailing submittals:

11.12.2 Submittals and Correspondence

The report shall consist of 8 1/2" x 11" sheets of paper. The report covers shall consist of durable binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages. A title shall identify the site, EODT, the Huntsville Center, and date. EODT's identification shall not dominate the title page.

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TABLE 11-1: DELIVERABLE DUE DATES

Deliverables	Date or Days After NTP
ASSHP	10 days prior to site visit
Draft Work Plan, (DID) OT-005	June 30, 2000
Final Work Plan	August 11, 2000
Conventional Explosives Safety Submittal	August 11, 2000
Report/Minutes, Record of Meeting DID OT-045	5 days after event
(1) Cost/Schedule Status Report DID OT-035 (NA for Fixed Price Orders)	Monthly
(1) Telephone Conversation/Correspondence Report (DID OT-055)	MONTHLY
Draft Site Specific Removal Report DID OT-030	January 5, 2001
Final Site Specific Removal Report	February 15, 2001
Accident/Incident Report DID OT-015	Written report within 24 hours after the incident occurrence
Accident Exposure Data Report DID SAFT-101	Monthly
OT-085 Weekly Status Report	1 st Working day of following week



TABLE 11-2: REPORT DISTRIBUTION

ADDRESS	DRAFT SUBMITTALS	DRAFT-FINAL & FINAL SUBMITTALS
U.S. Army Engineering and Support Center, Huntsville ATTN: CEHNC-OE (Bob Nore) 4820 University Square Huntsville, AL 35816-1822	3	3
Commander U.S. Army Corps of Engineers, Sacramento District ATTN: CESPK-ED-E (Bruce Handel) 1325 J Street Sacramento, CA 95816-1822	3	3
Commander 52 nd EOD Group, Fort Gillem Building 736 Forest Park, GA 30050-5001	1	1

11.12.3 Review Comment

EODT shall review all comments received through Mr. Bob Nore, the CEHNC PM, and evaluate their appropriateness based upon merit. EODT shall incorporate all applicable comments and provide a written response to each no later than 21 days after EODT receives the comments.

11.12.4 Identification of Responsible Personnel

Each submittal shall identify the specific members and title of the subcontractor(s) and EODT's staff, which had significant input into the report.



11.12.5 Presentations

EODT shall make presentations of work performed and as directed by the KO. The presentation shall consist of a summary of the work accomplished and will be followed by an open discussion.

11.12.6 Minutes of Meetings

Following the presentation and the public meeting, the Contractor shall prepare and submit minutes of the meeting within 5 working days to the KO.

11.12.7 Correspondence

EODT shall keep a record of telephone conversations and written correspondence affecting decisions relating to the performance of the former Benicia Arsenal project. A summary of the telephone conversations and copies of written correspondence shall be submitted to the CEHNC PM with the Cost/Schedule Status Report.

11.12.8 Schedule Status Report

EODT shall prepare and submit a weekly report. The report shall be submitted to the CEHNC PM and/or placed on EODT's web site EODT@EODT.com on the Tuesday following the previous work week. This report will also include enough information to suffice as a monthly report.

11.13 SITE SPECIFIC REMOVAL REPORT

At the conclusion of all field activities, EODT shall submit a Site Specific Removal Report IAW DID OT-030 to the basic contract. In addition, the following information shall be submitted.

- All original surveying and mapping data from Task 4
- A daily journal of all activities associated with this SOW
- A recapitulation of exposure data (This shall include total number of man-hours worked on site, total motor vehicle mileage, total number of personnel flying hours, and number of flights.)
- Scrap turn-in documentation
- A minimum of 20 color photographs of major activities and UXO discoveries
- A financial breakdown by area and by task of all costs and labor hours used to perform this SOW
- A written record of all endangered or threatened plants and animals destroyed during the OE removal activities on-site



- Two copies of a narrated videotape (minimum of 45 minutes in length) depicting all major activities

11.14 PUBLIC AFFAIRS

EODT shall not publicly disclose any data generated or reviewed under this contract and shall refer all requests for information concerning the site condition to Mr. Bob Nore, the CEHNC PM.

Reports and data generated under this TO are the property of CEHNC and distribution to any other sources by EODT, unless authorized by the KO, is prohibited.

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CHAPTER 12: ENVIRONMENTAL PROTECTION PLAN (EPP)**12.1 INTRODUCTION**

As specified in Task Order 0019 of Contract DACA87-97-D-0005 for the clearance at the former Benicia Arsenal, this site-specific EPP has been prepared to ensure site activities are conducted such that potential environmental impacts are minimized consistent with AR 200-1 & 2. This plan has been prepared based on information obtained from the Engineering Evaluation/Cost Analysis (EE/CA), Former Benicia Arsenal, Solano County, California, March 2000. All site activities shall be conducted IAW this EPP and shall be performed in such a manner as to minimize the pollution of air, water, or land; to control and maintain noise and dust emissions below limits established by applicable Federal, state, or local regulations; and to minimize the environmental impact of site activities.

12.1.1 Purpose

The following sections provide information pertaining to protected resources and sensitive species that occur on or near the arsenal. No contaminated waste, run on/off, or sediment controls are anticipated; and the use of dust control should not be required. Situations requiring these controls are addressed in this EPP and have been considered by EODT so that in the event they are encountered, the appropriate procedures may be approved and implemented negating a cessation of site activities.

12.2 EXISTING CONDITION SURVEY

In preparation for this OE removal action, the EODT PM performed an initial site visit accompanied by the CEHNC PM and the CESPCK PM and made a joint survey of existing site conditions. The purpose of this site visit was to assess the site conditions and gather information for the preparation of this submission. Before any UXO operations a CESPCK biologist will visually inspected the OE removal sites for sensitive species and habitats and protected resources. Any wetlands, endangered species, special habitat areas, or cultural and natural resources within the removal sites will be identified or marked.



12.3 EXISTING ENVIRONMENT WITHIN PROJECT SITE

12.3.1 Endangered/Threatened Species

The Former Benicia Arsenal and surrounding areas support a number of sensitive biological resources that may utilize the former arsenal and potentially may be affected by this OERA.

12.3.1.1 Species that may be present

Federally endangered species in the area include the American peregrine falcon (*Falco peregrinus anatum*), which may potentially forage over portions of the former Benicia Arsenal but does not appear likely to nest in the area due to lack of suitable cliff sites. The callippe silverspot butterfly, listed as endangered, is primarily found in native grassland but may occur on the arsenal property if its larval foodplant, Johnny jump-up (*Viola pedunculata*), is present. Federally listed threatened species that may be present at the site include the California red-legged frog (*Rana aurora draytonii*), giant garter snake (*Thamnophis couchiigigas*), and the bald eagle (*Haliaeetus leucocephalus*).

12.3.1.2 Species known to be present

Only two sensitive wildlife species have been verified as occurring on the former Benicia Arsenal: the Suisun song sparrow (*Melospiza melodia maxillaris*) and the black rail (*Laterallus jamaicensis*). Both are considered "Species of Concern" (SC) by the US Fish and Wildlife Service. These are not federally protected species.

12.3.2 Wetlands

The most probable sensitive habitats on the former Benicia Arsenal would be jurisdictional wetlands. These are wetlands that could occur along any of the streams, drainages, swales, or other water bodies that can be found on the site. A confirmed wetland area has been identified in the Demolition Area within the Tourtelot Property. This area, however, is within Sector 3, which is not included in this OERA.

12.3.3 Cultural and Archaeological Resources

Several of the historic arsenal buildings are protected under the National Historic Preservation Act (NHPA). None of these buildings will be affected during OE removal action.

12.3.4 Water Resources

The majority of surface run-off within the former arsenal boundaries is captured in a drainage channel that flows from north to south and discharges into Suisun Bay. Most other smaller drainages on the arsenal flow southeast or southwest into the main drainage channel. Lake Herman and its drainage supports riparian vegetation and possibly some freshwater marsh habitat. The low-lying land east of the Exxon refinery along Industrial Way is subject to flooding during high run-off periods.

12.3.5 Coastal Zones

The former arsenal boundary extends to the Carquinez Strait and Suisun Bay, which support coastal marsh habitat. Historically, the upland property supported primarily native grasslands that graded into marshland communities near the water's edge.

12.3.6 Trees and Shrubs That May Be Removed

The vegetation occurs on the former arsenal in three general habitats: grassland, willow riparian, and coastal marshes.

12.3.6.1 Grassland habitat

Much of the former arsenal is grassland that has been impacted by agriculture, grazing, and development. Grasslands contain very few shrubs; therefore, only a very limited number of shrubs may be removed from the grasslands.

12.3.6.2 Willow riparian habitat

The edges of Lake Herman, its drainage, and associated stream courses support willow riparian habitat. Trees and shrubs supported in this habitat include several willow species (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), blackberry (*Rubus ursinus*) and wild rose (*Rosa* sp.). Grazing has also impacted these areas, especially the understory. Any OE removal in the willow riparian habitat is likely to be accompanied by the destruction of some shrubs. Trees would not be destroyed.

12.3.6.3 Coastal Marsh habitat

The coastal marshes are not within the areas to be cleared during this OERA.

12.3.6.4 Waste Disposal Sites

There are no known waste disposal sites within the areas to be cleared during this OERA.

12.4 ASSESSMENT OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**12.4.1 Cultural Resources**

The primary law governing cultural resources is the National Historic Preservation Act [NHPA (Public Law 93-91)], which addresses protection of historic and cultural resources. Section 110 of the NHPA mandates that all federal agencies carry out a cultural resources program to identify and preserve historic properties under their ownership or control. Section 110 of the NHPA cautions that special consideration should be given to the likelihood that unanticipated discoveries may prove to be significant. If an unanticipated historic or archaeological site is encountered, CEHNC will be notified promptly, and a written record will be maintained and submitted as part of the final report.

12.4.2 Environmental Resources**12.4.2.1 Endangered Species Act**

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

12.4.2.2 Migratory Bird Treaty Act

Section 2 of the Migratory Bird Treaty Act (MBTA) prohibits, at any time, by any means, or in any manner, pursuit, hunting, take, capture, killing, or any attempt to take, capture, or kill migratory birds protected by the MBTA, except as exempted by federal and state regulation. Until recently, only regulatory agencies had promoted project compliance with the MBTA. Impacts to riparian vegetation will be minimized to the greatest extent practicable.



12.4.3 Clean Water Act

Section 404 of the Clean Water Act (CWA) provides the regulatory mechanism necessary to minimize or avoid wetland impacts resulting from reuse. Under Section 404, any action implemented by reusers that would directly involve the placement of fill material, dredging from, or flooding of wetlands or other waters of the United States requires permitting prior to implementation. Riparian wetlands (those occurring on streams) on the former Benicia Arsenal are also subject to the California Fish and Game Code Sections 1600-1607. Areas, which would be subject to Section 404 permit and mitigation requirements, as well as areas designated as habitats under Fish and Game statutes, will be evaluated for OE at the surface only. No intrusive activities will be performed in areas that qualify for these designations. There is no increased risk of exposure for such areas, since any excavation in the areas is already preempted by law.

12.5 PROTECTION AND MITIGATION OF SENSITIVE RESOURCES

12.5.1 Endangered/Threatened Species

12.5.1.1 Coordination of activities

If an excavation is required in an area of a federally protected plant or animal species, excavation shall proceed only after coordination through the Project Manager or the designated representative. Any questions about potential endangered or sensitive species will be brought to the attention of CEHNC. All site personnel will be informed of any specific recommendations of the CEHNC, and in general all operations shall be planned and performed in such a manner as to avoid or minimize adverse effects to the known protected species.

12.5.1.2 Worker education briefing

Prior to commencement of ordnance sampling, all on-site personnel will be briefed on the ecology of sensitive species in the area. Methods for minimizing potential impacts to these species will form an integral part of the on-site training. Field personnel will be encouraged to ask questions about potential environmental issues they may encounter during site activities.

12.5.1.3 Mitigation by avoidance

If endangered/threatened species are determined to fall within the OE removal site, extra care will be taken to minimize both time spent in the area and the amount of clearing activity.



12.5.2 Wetlands

12.5.3.1 Environmental guidance

If potentially sensitive habitats (e.g., springs, wet areas, etc.) are encountered during site activities, guidance from CEHNC environmental personnel will be obtained. In Sector 2 EODT will use a Government provided Biologist to point out areas that cannot be disturbed. EODT will collect data from either side of the stream to determine if the need to search in the water is warranted. EODT will make recommendations to CEHNC for clearance activities in the streambed based on the amount of OE/OE Scrap being found. If it is determined by CEHNC that subsurface clearance is appropriate, the Government provided Biologist will be consulted to point out areas that cannot be disturbed. If it is determined subsurface clearance is not appropriate in these areas, only surface clearance activities will be conducted.

12.5.3.2 Minimize Vehicle Impact

The movement of vehicles and other machinery across a wetland would produce extensive damage. To minimize these potential impacts, equipment should avoid known wetlands by a distance of at least 10 feet whenever possible.

12.5.3 Cultural and Archaeological Resources

12.5.3.1 Mitigation by avoidance

All known cultural resources will be avoided during OE removal activities. OE removal will not be performed within 5 feet of original Benicia Arsenal building foundations. If cultural resources are determined to fall within the site, extra care will be taken to minimize both time spent in the area and the amount of clearing activity. The Government-provided Biologist will be consulted to point out areas that cannot be disturbed. Additionally a surface clearance will be conducted over the earth-covered bunkers for Sector 5.

12.5.3.2 Worker education briefing

Prior to commencement of OE removal, all on-site personnel will be briefed regarding sensitivity to cultural resources in the area. Methods for minimizing potential impacts to cultural resources will form an integral part of the on-site training. Field personnel will be encouraged to ask questions about potential cultural resource issues they may encounter during site activities.



12.5.4 Water Resources

12.5.4.1 General requirements

EODT shall control the transfer, use and disposal of fuels, oils and other harmful materials both on and off the site, and shall comply with applicable local laws and regulations concerning pollution of air, water, and soils. Special measures shall be taken to prevent sediment, chemicals, fuels, oils or other harmful materials from entering public waters.

12.5.4.2 Control of water used on-site

All on-site activities will be conducted in a manner so as to prevent the discharge of any known pollutants into reservoirs and waterways. Temporary chemical toilets will be available at the site.

12.5.4.3 Run-on controls

EODT shall take all reasonable precautions to prevent run-on from entering areas of the site where the water may be exposed to contaminated soils, water, or waste as a result of EODT site activities. Such precautions may include temporary dikes or by not conducting removal operations during rainstorms. These control measures will be monitored and maintained as long as the need exists.

12.5.4.4 Run-off controls

Appropriate controls shall be put in place to prevent or minimize rainfall from contact with hazardous or special wastes/materials created by EODT. This would include activities such as covering the roll-off container with plastic coverings and securing the cover. In those areas where run-off may contain significant levels of contamination such runoff shall be contained and collected to prevent its migration from the site.

12.5.4.5 Sediment Controls

Sediment that may or may not contain significant levels of contamination shall also be contained to prevent it from migrating off site. Disturbances to loose sediment will be limited during surveys and removal activities. It is not anticipated that soil erosion, and, therefore, sediment control will present any significant problems. If needed, fabric silt fences, diversion dikes, and ditches will be installed to adequately control erosion problems and control sediment migration. All erosion and sediment control measures will be properly maintained throughout the duration of the project as needed and areas of bare soil exposed at any given time during excavation will be kept to a minimum to minimize erosion potential.



12.5.5 Coastal Zones

No coastal zones are within the areas affected by this OE removal action. No mitigations, therefore, are required.

12.6 PROCEDURES AND METHODS FOR PROTECTION AND MITIGATION

12.6.1 Tree and Shrub Removal

Vegetation removal and brush trimming (to the extent necessary) will be conducted as needed on a grid-by-grid basis by OE removal teams, to allow for the effective use of detection technologies.

12.7 PROCEDURES FOR MITIGATION OF IMPACTS FROM ROUTINE ACTIVITIES

12.7.1 Waste Disposal

12.7.1.1 Uncontaminated waste

Uncontaminated solid wastes, such as trash and general debris, shall be placed in designated trash receptacles and shall be removed from the site and disposed of at a facility authorized by applicable local laws and regulations to receive such waste. No solid or liquid wastes are to be burned, buried or otherwise left on site.

12.7.1.2 Contaminated waste

Although it is not anticipated, contaminated hazardous waste consists of a wide variety of materials that may originate on site as a result of on-site activities. Contaminated wastes will be packaged, handled and labeled IAW applicable Federal and local regulations. Manifesting, transportation and disposal of contaminated wastes will be conducted IAW 40 CFR 262 Subpart B and applicable regulations, as directed by the KO.

12.7.2 Burning

Except for open detonation (OD) activities conducted as required for OE disposal, materials shall not be burned on site without the written authorization of the KO.



12.7.3 Dust and Emission Control

EODT shall maintain all staging sites and work areas free from excess dust to such a reasonable degree as to avoid causing a hazard or nuisance. Dust control measures, therefore, will most likely not be needed. Dust generation will be minimal. The only dust-generating activities anticipated at the former arsenal are vehicular traffic and demolition operations. EODT designs and plans its work methodically to minimize vapors, gases, and particularly emissions. No vapors or gaseous emissions are anticipated under this SOW from excavation or demolition activities.

12.7.4 Spill Control and Prevention

12.7.4.1 Spill potential

Due to the nature of site activities, the potential for a spill of hazardous materials is extremely low. No vehicular fueling will be conducted on-site. EODT shall take all necessary precautions to prevent spills and provide contingency measures for the cleanup of potential spills during performance of this SOW. To minimize the potential for spillage and to minimize the impact of spilled materials, EODT shall follow these procedures:

1. As part of the SSHP for this project, EODT will submit Spill Response procedures to the KO for review and approval.
2. Utilize work practice controls to prevent spills during refueling involving site vehicles.
3. Provide all spill response supplies and equipment necessary to contain spilled materials and to remove and contain materials that become contaminated due to spillage.
4. Develop and implement decontamination procedures that may be necessary for the removal and clean up of spilled materials.

12.7.5 Decontamination and Disposal

It is not anticipated that EODT personnel or equipment will require decontamination during the daily conduct of site operations. In the event of a spill that causes contamination of site equipment, EODT shall decontaminate all equipment that has been exposed to contaminated material. This decontamination-derived waste shall be contained and labeled IAW applicable regulations. This waste will be disposed of according to the direction of the KO.



12.7.6 Emergency Procedures

As part of the Spill Response procedures in the SSHP for this project, EODT will develop emergency response procedures to be implemented in the event of the spillage of hazardous materials. At a minimum, EODT shall perform the following emergency procedures:

1. Immediately (within one hour) notify the KO
2. Halt site operations in the area and take immediate measures, utilizing properly protected personnel, to control and contain the spill
3. Isolate the hazardous area through the use of flagging, remove or extinguish ignition sources and evacuate all unnecessary personnel out of the area
4. If mandated by the nature of the spill, evacuate personnel upwind to the pre-designated assembly area, and post personnel at access routes to prevent unauthorized personnel from entering the area
5. Utilize control measures, if needed, to reduce vapors, gases and/or dust emissions

12.7.7 Storage Areas and Access Routes

Except for any work or storage areas and access routes specifically assigned to EODT under this SOW, the land areas outside the limits of the permanent work under this contract shall be preserved in their existing condition. EODT shall confine their site activities to areas defined for work on the plans or specifically assigned for their use. CEHNC personnel will assign storage and related areas, and no other areas shall be used by EODT without the consent of CEHNC personnel. Upon conclusion of on-site remediation activities, and subject to instructions by the KO, EODT shall remove all work-related equipment and materials, and shall, unless directed otherwise, remove all evidence of removal or remediation activities.

12.8 ISOLATION AND SECURITY OF THE AREA

12.8.1 Site Security

During operations, access to work sites will be controlled by the use of exclusion zones, and a periodic visual survey of the surrounding area to ensure no personnel enter the site. This will be especially critical during incidental BIP. As a result, the judicious use of site personnel as sentries will be implemented during demolition operations. Entry into the various sites will be limited to only those personnel required to safely conduct the task at hand. Visitors will be controlled and escorted, the only exception to this will be the CEHNC OSS, who will have unlimited access to all areas. During non-working periods, the equipment, to include hand tools, will be secured.



12.9 CONSIDERATION OF WIND DIRECTION

Prior to the initiation of site activities, EODT shall ascertain the prevalent wind direction and will plan the site layout so as to locate, to the best extent possible, assembly points in a location upwind from the site. Consideration of prevalent wind direction shall also be taken when planning the location of assembly points to be used in the event of emergencies. In the event that wind direction changes significantly, the EODT UXOSO will inform all site personnel of the adjusted locations of the assembly points. Prior to on-site demolition operations, the wind direction will be ascertained and, if possible, demolition personnel will stage the operations from an upwind, protected position. In addition, the UXOSO will contact the National Weather Service on a daily basis to determine prevailing winds and temperatures. These factors will be considered in planning the day's operations. Personnel will be informed accordingly.

12.10 REDUCTION OF VAPORS, GASES, OR DUST EMISSIONS

EODT designs and plans its work methodically to minimize vapors, gasses and particularly emissions. No vapors or gaseous emissions are anticipated under this SOW from excavation or demolition activities.

12.11 POST-REMEDATION CLEAN-UP

12.11.1 General Requirements

Except for any work or storage areas and access routes specifically assigned to EODT under this SOW, the land areas outside the limits of the permanent work under this contract shall be preserved in their existing condition. EODT shall confine their site activities to areas defined for work on the plans or specifically assigned for their use. Upon conclusion of on-site remediation activities, and subject to instructions by the KO, EODT shall remove all work-related equipment and materials, and shall, unless directed otherwise, remove all evidence of removal or remediation activities.

12.11.2 Temporary Facilities

EODT shall, unless directed in writing by the KO, remove all signs of temporary facilities such as work areas, corner flags and other vestiges of site operations prior to final acceptance of the work by the CEHNC. EODT's goal is to leave the area in better condition than we found it.

12.11.3 Disturbed Areas

All detonation holes shall, to the greatest extent feasible, be returned to their previous state.



12.11.4 Post-excavation Cleanup

Upon project completion and subject to instructions by the KO, the contractor shall restore locations disturbed by operations, except those areas where brush/trees were removed. Excavated and trafficked areas shall be returned to natural grade and indigenous vegetation re-established by seeding or planting sprigs.

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CHAPTER 13: INVESTIGATIVE DERIVED WASTE PLAN

(Not Applicable for this Project)