

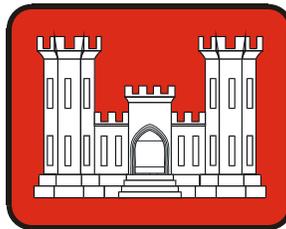
**Site-Specific Safety and Health Plan
for
RCRA Subpart X Permit
OB/OD Area
at
Tooele Army Depot
Tooele, Utah**

**Contract No. W91278-09-D-0040
Task Order No. 0003**

June 2010

Prepared for

**Tooele Army Depot (TEAD)
Under Contract to
U.S. Army Corps of Engineers
Mobile District**



Prepared by

 **Tetra Tech NUS, Inc.**

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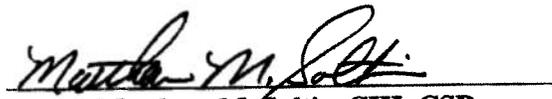

**Matthew M. Soltis, CIH, CSP
Health and Safety Manager
Tetra Tech NUS, Inc.**

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ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air-Purifying Respirator
bgs	Below ground surface
CFR	Code of Federal Regulations
CNS	Central Nervous System
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
DPW	Director of Public Works
DOT	U.S. Department of Transportation
EOD	Explosive Ordnance Detachment
EPA	Environmental Protection Agency
eV	Electron Volts
FID	Flame Ionization Detector
FOL	Field Operations Leader
GI	Gastrointestinal
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High-Efficiency Particulate Air
HSM	Health and Safety Manager
IARC	International Agency for Research on Cancer
IDLH	Immediately Dangerous to Life or Health
LEL	Lower Explosive Limit
LFL	Lower Flammable Limit
MIS	Multi-Incremental Sampling
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OB	Open Burning
OD	Open Detonation

OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SSHP	Site Safety and Health Plan
SHSO	Site Health and Safety Officer
STEL	Short-Term Exposure Limit
TEAD	Tooele Army Depot
TtNUS	Tetra Tech NUS, Inc.
UEL	Upper Explosive Limit
UFL	Upper Flammable Limit
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
URT	Upper Respiratory Tract
UV	Ultraviolet
UXO	Unexploded Ordnance

1.0 INTRODUCTION AND PERSONNEL ASSIGNMENTS

1.1 INTRODUCTION

The objective of this Site-Specific Safety and Health Plan (SSHP) is to provide the minimum safety practices and procedures to Tech NUS (TtNUS) and subcontractor personnel engaged in onsite duties associated with the Resource Conservation and Recovery Act (RCRA) Subpart X permit support activities, including surface soil sampling, groundwater sampling and risk assessment support, at the open burning/open detonation (OB/OD) area located at Tooele Army Depot (TEAD), Utah. The OB/OD area consists of three separate regulated units; the OB unit, the OD unit and the Static Fire unit. The OB/OD area has been in operation since the 1940s, used for demilitarization activities including munitions detonation and propellant burning.

Authorization: This SSHP and the work described herein have been completed under the authorization of:

Contract: US Army Corp of Engineers, Mobile District
Contract Number: W91278-09-D-0040
Contract Task Order Number: 0003

Statement of Work/Application (July 2009): This SSHP will support the following activities:

- Mobilization/Demobilization activities
- UXO Clearance activities
- Surface soil and groundwater sampling within the OD unit, OB unit, and Static Fire unit

See Section 4.0 for detailed task description.

Compliance: The elements of this SSHP are intended to be in compliance with the requirements established by:

- OSHA 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER).
- Applicable sections of 29 CFR 1926 "Safety and Health Regulations for Construction."
- Tetras Tech NUS Health and Safety Program.
- USACE Safety and Health Requirements Manual, EM 385-1-1, dated November 2003, where applicable.

The Project Health and Safety Officer (PHSO) and Project Manager (PM) will provide conflict resolution between convening standards, should the need arise.

This SSHP must be accompanied by the Tetra Tech NUS, Inc. Health and Safety Guidance Manual (TtNUS HSGM, 2004). The HSGM provides additional information in the areas of program support, standard operating procedures, and safe work practices.

Modifications/Changes: This SSHP has been prepared using the latest available information regarding known or suspected chemical contaminants and potential and foreseeable physical hazards associated with the planned work at TEAD. The following conditions are considered sufficient basis for review and possible changes to this document:

The addition or modification of activities/tasks outside of those specified in Section 4.0, Scope of Work.

New information becomes available through the course of the investigation or from outside sources.

All changes to this SSHP will be requested through the Project Manager (PM) to the Tetra Tech NUS Health and Safety Manager (HSM). It is the responsibility of the PM to notify affected personnel of the changes to this SSHP.

A signed copy of this SSHP and any approved modifications shall be conspicuously located and available for review by on-site personnel.

1.2 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibilities for site safety and health for TtNUS and subcontractor employees conducting the field activities described in Section 4.0. Personnel assigned to these positions shall exercise the primary responsibility for on site safety and health. These persons will be the primary point of contact for any questions regarding the safety and health procedures and the selected control measures identified within this SSHP.

- The TtNUS PM is responsible for the overall direction of health and safety for this project. Consult with the PHSO and/or the HSM as required to resolve health and safety issues arising at the project site.
- The PHSO is responsible for the development of this SSHP in accordance with applicable OSHA regulations as specified in Section 1.0 and to serve as technical support.
- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the SSHP with the assistance of an appointed Site Health and Safety Officer (SHSO). The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.
- The SHSO supports site activities by advising the FOL on the aspects of health and safety on site as they may pertain to regulatory requirements or task related hazards. These duties may include:

- Verify training and medical status of on-site personnel in relation to site activities.
 - Assist and represent TtNUS coordinating emergency services (if needed).
 - Provide elements site-specific training for on site personnel.
 - Coordinating health and safety activities.
 - Selecting, applying, inspecting, and maintaining personal protective equipment.
 - Establishing work zones and control points.
 - Implementing air monitoring procedures.
 - Implementing hazard communication, respiratory protection, and other associated safety and health programs.
- An Unexploded Ordnance (UXO) Lead, provided by TEAD, will provide onsite UXO avoidance support to include the following activities:
 - Site-specific training concerning types of UXO materials that are treated and may be encountered.
 - Evasive and site control measures to be taken by site personnel, if they encounter these or other UXO materials.
 - Clearance of safety lanes and work areas as needed in and around the OB/OD area.
 - UXO detection and, as a last resort, relocation to facilitate sampling activities through cooperation with TEAD Explosive Ordnance Detachment (EOD) personnel.
 - On-call service to the entire field crew site-wide when, or if, UXO or suspected UXO materials are encountered.

The scope of the UXO Lead support is described in detail in Appendix B.

- Compliance with the requirements stipulated in this SSHP is monitored by the SHSO and coordinated through the TtNUS HSM.

Note: In some cases one person may be designated responsibilities for more than one position. For example, the FOL may also be responsible for the SHSO duties. This action will be performed only as credentials, experience, and availability permits.

1.3 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: TEAD **Client Contact:** Environmental Engineer (TEAD)

Address: Tooele, Utah **Phone Number:** (435) 833-3504

Effective Date: July 2009

Proposed Dates of Work: July 2009 - TBD

Project Team:

TtNUS Personnel:	Telephone No.:
<u>Project Manager (PM)</u>	<u>(301) 528-3021</u>
<u>Field Operations Leader (FOL)</u>	<u>(301) 528-3021</u>
<u>Site Safety and Health Officer (SHSO)</u>	<u>(301) 528-3021</u>
<u>Field Sampling Technician</u>	<u>(301) 528-3075</u>
<u>Project Health and Safety Officer (PHSO)</u>	<u>(412) 921-8678</u>
<u>Health and Safety Manager (HSM)</u>	<u>(412) 921-8912</u>

Non-TtNUS Personnel:	Discipline/Tasks Assigned:	Telephone No.:
<u>TBD (for each sampling event)</u>	<u>Laboratory</u>	<u>TBD</u>
<u>TEAD</u>	<u>UXO Support Lead</u>	<u>TBD</u>

TBD - To be determined

Plan Preparation: Hazard Assessments (for purposes of 29 CFR 1910.132) and SSHP preparation conducted by:

Project Health and Safety Officer (PHSO)

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section of the SSHP is part of a preplanning effort to direct and guide field personnel in the event of an emergency. The first measure in accomplishing this objective is to define, what is and is not, an emergency.

An emergency as defined in 1910.120 is:

An occurrence or condition that can or has resulted in an uncontrolled release of a hazardous substance or potential safety hazard (i.e., fire, explosion, chemical exposure) associated with that release.

An incidental release as defined in 1910.120 is:

The releases of a hazardous substance that can be absorbed, neutralized, or otherwise controlled and will not result in potential safety hazard (i.e., fire, explosion, chemical exposure) are not considered emergency responses.

Based on the above definitions, TtNUS will provide through on-site resources initial incident response measures for incidents such as:

- Initial fire-fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provision of initial medical support for injury/illness requiring only first-aid level support
- Provision of site control and security measures as necessary

Incidents and conditions above this level of participation are and will be considered emergencies. These events are considered beyond the capabilities of field personnel and above available resources to provide emergency response safely. The emergency response agencies

listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders in the event of an emergency. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time.

This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(I)(1)(ii).

The FOL and/or the SHSO are responsible for the Emergency Action Plans implementation. Any questions should be directed to them or the PHSO for clarification.

2.2 EMERGENCY PLANNING – RECOGNITION AND PREVENTION

The primary focus of this section is the ability to recognize and control factors that could contribute to an incident/emergency situation and/or condition. Situations and/or conditions recognized that could lead to an incident/emergency situation include:

Physical Hazards

- UXO
 - Detonation – Fragmentation/trauma
 - UXO discovery

Visual examination and magnetic detection will be employed to detect UXO/Munitions and Explosives of Concern (MEC)/Discarded Military Munitions (DMM). TEAD will provide EOD personnel to clear travel lanes and sampling locations in an effort to identify and remove these items from the work and access travel lanes. Detection of UXO by sample personnel will be considered an emergency and site personnel will evacuate until TEAD EOD can facilitate removal.

- Cuts and lacerations – metal shards within the treatment and/or travel lanes

To prevent hazards of this nature, the EOD personnel clearing sample and travel lanes will remove to the extent possible metal shards within these designated areas. In addition, personnel sampling will employ knee pads to kneel down and collect their samples. This will prevent potential punctures/cuts/lacerations associated with kneeling on top of any metal shards and/or debris.

See Section 6.1 Physical Hazards, Table 5-1 Tasks/Hazards/Control Measures Compendium for additional control measures to minimize or eliminate these hazards.

2.2.1 General Practices – Pre-Emergency Planning

To further minimize and eliminate these potential emergency situations, emergency planning activities associated with this project, the following responsibilities are assigned to the FOL and/or the SHSO:

- Coordinating with TEAD emergency services personnel to ensure that emergency action activities are compatible with existing local emergency response procedures. Base fire protection and emergency services will be notified of scheduled events and activities.
- Identifying a chain of command for emergency action. FOL/SHSO will serve as Incident Commander during incidental response measures. Once the incident is declared an emergency the responding agency will assume command upon arrival.
- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information will include the following:
 - Chemical inventory (for substances brought to, and used onsite), with Material Safety Data Sheets (MSDS) for the hazardous substances present.

- A site map indicating routes of ingress/egress (safety lanes).
 - Medical data sheets for personnel onsite (see Section 8.0).
 - Emergency notification phone numbers.
 - A log book identifying personnel onsite each day and their locations.
 - Hospital route maps with directions (these should be placed in each site vehicle).
 - A copy of this SSHP, the USACE Safety and Health Guidance Manual, and the TtNUS Health & Safety Guidance Manual.
- Educating site workers - Educating site workers to the potential emergency situations that may exist and the associated control measures will be critical in early recognition and prevention. This will be accomplished through
 - Site specific training
 - Use and application of the Safe Work Permit System (See Section 9.2)
 - Daily Tool Box Meetings
 - Previewing work areas to identify, barricade, or remove physical hazards where identified.
 - Survey Work Areas before committing personnel and resources - Identify, remove, and/or barricade physical hazards within the estimated work area. Due to the nature of the work to be conducted this activity will be conducted by TEAD EOD Support personnel. The FOL and/or the SHSO will provide assistance where possible.
 - Ensure that access lanes and sampling locations are clear of UXO/MEC/DMM. In addition, the TEAD EOD person with the assistance of the FOL and/or the SHSO shall remove any obstruction, metal shards, etc.
 - During this clearing, adequate passage to the work area will be cleared and maintained to permit access by emergency vehicles.

- The TEAD EOD person with the assistance of the FOL and/or the SHSO shall remove, demarcate, or otherwise barricade and physical hazards within the work area.

- Provide the necessary emergency action equipment to control potential emergencies (i.e., safety cans for flammable liquid storage, spill containment equipment, PPE, and emergency equipment such as portable fire extinguishers). See Section 2.7.

- Evaluate operations to ensure that necessary measures are taken to control and/or minimize the impact of emergency situations/conditions. This includes actions such as, but not limited to:
 - Ensuring equipment and resources are at the ready for response to incidental measures;
 - Ensuring personnel are adequately trained in the provisions of this SSHP and this Emergency Action Plan; ensuring control measures specified within Table 5-1 and the Safe Work Permits are being incorporated into the applicable tasks.

The duties of the site work crew include:

- Travel and work only within designated cleared (UXO/MEC/DMM free) areas.

- Do not kick, pick up or otherwise handle any unidentified objects without EOD clearance and approval.

- Identify, remove, or barricade physical hazards within the estimated work area identified by the FOL and/or the SHSO.

- Follow the guidelines for control of emergency conditions.

- Report any potential emergency situation to the FOL and/or the SHSO.

2.3 SAFE DISTANCES AND PLACES OF REFUGE/EMERGENCY ALERTING

In the event of an incident, personnel will engage identified resources necessary to prevent the condition/situation from becoming an emergency. In the event these initial response measures cannot control the incident personnel will undertake the following measures:

- Provide emergency life saving measures, as necessary.
- Evacuate non-essential personnel to identified safe places of refuge and secure the immediate area.
- The TEAD EOD person, the FOL and/or the SHSO will notify emergency services utilizing a Range Control provided radio
 - Give the emergency operator the location (i.e., of the emergency and a brief description of what has occurred.
 - Stay on the phone and follow the instructions given by the operator.
 - The appropriate agency will be notified and dispatched.
- Field personnel will provide perimeter security of the work area until emergency services arrive.
- Once emergency services arrive, TtNUS and subcontractor personnel will report to the designated safe place of refuge. This location will be identified in the field by the FOL and/or the SHSO prior to the commencement of on-site activities. At this location the FOL and/or the SHSO will take a head count to ensure that personnel are accounted for.

2.3.1 Critical Operations

There are no operations being conducted under this scope of work that are considered critical and would require an individual or individuals to man during an emergency. Therefore in the event of an emergency site personnel will cease operations and report to the safe place of refuge.

With that said, if a person is injured, one person will stay with the injured party while the other directs emergency services to the location.

2.4 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

Site contamination within this area is considered minimal. Therefore, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination of medical incidents and emergencies will proceed in the following manner.

2.4.1 Non-Life Threatening Medical Incident (Bruises, Cuts, Scrapes, Etc.)

The area of clothing or suit penetration will be isolated from the decontamination procedure by removing the protective garments or clothing surrounding the area of the injury and applying a light gauze wrap and plastic cover. Decontamination for unaffected areas will proceed as per Table 5-1 of this SSHP.

2.4.2 Life Threatening

Begin life saving techniques as appropriate (CPR, cooling or warming regimens, etc.). Cover the injured in a blanket to prevent the onset of shock.

- If it will not endanger the injured individual (i.e., spinal cord injury, etc.) remove any outer PPE. Removal may require the use of bandage scissors to remove the outer garments.
- Notify Range Control request Emergency Medical Services to your location.

Note: One person from the field team will accompany the injured to the hospital with their medical data sheet, any appropriate MSDSs, a copy of this SSHP, and the incident forms. This person will collect as much information as possible, and transfer that information to the HSM and WorkCare as per the Incident Response Protocol provided in Figure 2-1. Other personnel will engage site control/site security measures.

The SHSO upon ensuring care for the injured party will engage an investigation of the incident to gather as much information as possible. This includes as a minimum answering the questions Who? What? Where? When? Why? and How?. This information will then be communicated to the PM and the HSM. Attachment I Tetra Tech NUS, Inc. Injury/Illness Procedure will be used to accomplish this task.

2.4.3 Emergency Medical Treatment

Tetra Tech NUS and subcontractor personnel are only permitted to provide treatment to the level of their First-Aid Training. It should also be noted, first aid shall be administered voluntarily. Provisions for medical treatment for life threatening injuries will be available within 3 to 4-minutes travel time or identified person(s) of the field crew will be trained in First Aid and CPR as well as provisions within the Bloodborne Pathogen Standard 29 CFR 1910.1030.

FIGURE 2-1
INJURY/POTENTIAL EXPOSURE RESPONSE PROTOCOL
TOOELE ARMY DEPOT, UTAH

The purpose of this protocol is to provide guidance for the medical management of injury situations. In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this SSHP by suitable and appropriate conveyance (i.e., ambulance for serious events).
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the exposed person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. The care of the victim will be monitored by WorkCare physicians. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 (enter Extension 109), or follow the voice prompt for after hours and weekend notification, and be prepared to provide:
 - Any known information about the nature of the exposure.
 - As much of the exposure history as was feasible to determine in the time allowed.
 - Name and phone number of the medical facility to which the victim(s) has/have been taken.
 - Name(s) of the exposed Tetra Tech NUS, Inc. employee(s).
 - Name and phone number of an informed site officer who will be responsible for further investigations.
 - Fax appropriate information (e.g., MSDS) to WorkCare at (714) 456-2154.
 - Contact Corporate Health and Safety Department and Human Resources at 1-800-245-2730 (Monday through Friday, 8:00 a.m. to 5:00 p.m).

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare. WorkCare will compile the results of the data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials. Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

**FIGURE 2-1 (continued)
 INJURY/POTENTIAL EXPOSURE REPORT**

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. Exposing Agent

Name of Product or Chemicals (if known): _____

Characteristics (if the name is not known)

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing? _____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was there skin contact? _____

Was the exposing agent inhaled? _____

Were other persons exposed? If yes, did they experience symptoms? _____

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat	Chest Tightness / Pressure
Tearing	Nausea / Vomiting
Headache	Dizziness
Cough	Weakness
Shortness of Breath	

Delayed Symptoms:

Weakness	Loss of Appetite
Nausea / Vomiting	Abdominal Pain
Shortness of Breath	Headache
Cough	Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat	Nausea / Vomiting
Tearing	Dizziness
Headache	Weakness
Cough	Loss of Appetite
Shortness of Breath	Abdominal Pain
Chest Tightness / Pressure	Numbness / Tingling
Cyanosis	

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved: _____ Worsened: _____ Remained Unchanged: _____

V. Treatment of Symptoms (check off appropriate response)

None: _____ Self-Medicating: _____ Physician Treated: _____

Emergency medical treatment will be initiated under the following guarded restrictions:

- Take the necessary precautions to prevent direct contact with the injured person's body fluids. This may be accomplished through the employment of the following measures:
 - Use surgeons gloves when handling cuts, abrasions, bites, punctures, etc. or any part of the injured person. The use of safety glasses and surgeons masks is recommended, if there is the potential for uncontrolled spread of body fluids. The PHSO will be immediately notified in event that personnel providing emergency first-aid come into contact with body fluids or other potentially infectious tissues while providing first aid or CPR.
 - Should Cardio-Pulmonary Resuscitation (CPR) be required, use a CPR Micro-Shield mouthpiece when administering CPR to prevent contact with the injured person's body fluids.

In order to engage these protective measures the FOL shall ensure that these items are part of each first-aid kit.

2.5 EMERGENCY CONTACTS

Range Control will provide the Tetra Tech NUS, Inc. field team with a two way radio. The radio will be employed for

- Maintaining contact with Range Control.
- Alert Range Control to request Emergency Services Support

As a redundant control, a mobile/cellular phone shall be available on site. It will be the responsibility of the FOL and/or the SHSO to test or otherwise ensure that the signal strength is sufficient to contact Range Control in the event of an emergency.

Prior to the commencement of onsite activities, the SSO will notify the individuals identified as part of the emergency response notification procedures. A list of the Emergency Coordinators is included as Table 2-1.

Hospital services and transportation will be arranged by TEAD Emergency Coordinators and staff, should the need arise.

2.6 PPE AND EMERGENCY EQUIPMENT

The following Emergency Equipment is recommended to support on-site activities

- First aid kit(s)
- Fire extinguisher(s) At least one fire extinguisher (minimum 1 lb ABC Unit) will be maintained for on-site operations. The unit will be immediately available for use in the event of an emergency.

The number of units will be determined by the SHSO. Currently, it is anticipated that:

- 1 - First-Aid kit in the Support Vehicle
- 1 - First-Aid kit for each operation area separated from the Support Vehicle location greater than 500-feet
- 1 - Fire Extinguisher for each flammable storage location

2.7 INJURY AND ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS “Injury/Illness Procedure” (Attachment I) must be followed. Following this procedure is necessary for documenting the information obtained at the time of the incident.

Also, as soon as possible, the appropriate Client Point of Contact must be informed of any incident or accident that requires medical attention.

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets filed onsite located in Attachment II of this SSHP. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

Table 2-1. List of Emergency Coordinators

Emergencies		Two Way Radio -Range Control	
Alternate: Emergencies		911 from TEAD phone or (435) 833-2911 from cell phone	
TEAD EMERGENCY COORDINATORS			
IOSC:	TEAD	Office Phone:	(435) 833-3504
FIRE DEPARTMENT SUPERVISORS			
Primary	Chief, Fire Department	Office Phone:	(435) 833-2015; or 911 - For Emergencies
AREA HOSPITALS			
Salt Lake Regional Medical Center		Business:	(801) 350-4111
		Emergency:	(801) 350-4631
Latter Day Saints Hospital		Business:	(801) 408-1100
		Emergency:	(801) 408-1130
University of Utah Hospital		Business:	(801) 581-2121
		Emergency:	(801) 581-2291
OTHER IMPORTANT NUMBERS			
Poison Control			(800) 222-1222
TtNUS Project Manager			(301) 528-3021
TtNUS Health and Safety Manager			(412) 921-8912
The following numbers will be used (after dialing 911) when initiating the emergency notification measures. The left-hand column represents the sequence of notification.			
1	Emergency Services		
2	TEAD-IOSC	Emergency Coordinator	Two Way Radio, 911 or (435) 833-2911 from cell phone
3	TEAD - Fire Dept.	Fire Chief	(435) 833-3504
4	TEAD	Environmental Coordinator	(435) 833-2015
5	TEAD	Safety Manager	(435) 833-3504
6	TtNUS	Project Manager	(435) 833-9005
7	TtNUS	Health and Safety Manager	(301) 528-3021

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Driving Directions from Tooele, UT to 1050 E South Temple, Salt Lake City, UT

Page 1 of 2

Driving Directions from Tooele, UT to 1050 E South Temple, Salt Lake City, UT

Page 2 of 2



MAPQUEST

Start: Tooele, UT US
End: 1050 E South Temple
 Salt Lake City, UT 84102-1507, US

Notes:

Directions	Distance
Total Est. Time: 44 minutes Total Est. Distance: 36.41 miles	
START 1: Start out going WEST on E VINE ST toward UT-36 / S <0.1 miles MAIN ST.	
2: Turn RIGHT onto UT-36 / N MAIN ST. Continue to follow UT-36.	11.5 miles
3: Merge onto I-80 E toward SALT LAKE.	20.8 miles
4: Keep RIGHT at the fork in the ramp.	0.5 miles
5: Stay STRAIGHT to go onto W 600 S / UT-269 E. Continue to follow W 600 S.	1.6 miles
6: W 600 S becomes MARTIN LUTHER KING JR BLVD.	0.2 miles
7: Turn LEFT onto S 700 E / UT-71. Continue to follow S 700 E.	0.9 miles
8: Turn RIGHT onto E SOUTH TEMPLE.	0.5 miles
END 9: End at 1050 E South Temple Salt Lake City, UT 84102-1507, US	
Total Est. Time: 44 minutes Total Est. Distance: 36.41 miles	



Start:
 Tooele, UT US

End:
 1050 E South Temple
 Salt Lake City, UT 84102-1507, US



These directions are informational only. No representation is made or warranty given as to their content, road conditions or route usability or expeditiousness. User assumes all risk of use. MapQuest and its suppliers assume no responsibility for any loss or delay resulting from such use.

<http://www.mapquest.com/directions/main.adp?do=prt&mo=ma&2si=navt&1gi=0&un=m&go=1&2gi=0...> 1/16/2006

<http://www.mapquest.com/directions/main.adp?do=prt&mo=ma&2si=navt&1gi=0&un=m&go=1&2gi=0...> 1/16/2006

Figure 2-2. Directions to Salt Lake Regional Medical Center

2-15

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Driving Directions from Tooele, UT to 8th Ave & C St, Salt Lake City, UT

Page 1 of 2

Driving Directions from Tooele, UT to 8th Ave & C St, Salt Lake City, UT

Page 2 of 2

Figure 2-3. Directions to Latter Day Saints Hospital



Mortgage Rates Hit Record Lows!
Click Your Current Rate
7.00% & above
5.00% - 6.99%
5.00% - 5.99%
4.00% & below
Lower MyBills.com
Bad Credit OK Easy Comparisons. More Choices. Bigger Savings.™

Start: Tooele, UT US
End: 8th Ave & C St
Salt Lake City, UT 84103, US

Notes:

Directions	Distance
Total Est. Time: 44 minutes Total Est. Distance: 36.02 miles	
START 1: Start out going WEST on E VINE ST toward UT-36 / S <0.1 miles MAIN ST.	
2: Turn RIGHT onto UT-36 / N MAIN ST. Continue to follow UT-36.	11.5 miles
3: Merge onto I-80 E toward SALT LAKE.	20.8 miles
4: Keep RIGHT at the fork in the ramp.	0.5 miles
5: Stay STRAIGHT to go onto W 600 S / UT-269 E.	1.0 miles
6: Turn LEFT onto S STATE ST / US-89.	0.9 miles
7: Turn RIGHT onto E SOUTH TEMPLE.	0.3 miles
8: Turn LEFT onto B ST.	0.6 miles
9: Turn RIGHT onto 8TH AVE.	<0.1 miles
END 10: End at 8th Ave & C St Salt Lake City, UT 84103, US	
Total Est. Time: 44 minutes Total Est. Distance: 36.02 miles	



Start:
Tooele, UT US

End:
8th Ave & C St
Salt Lake City, UT 84103, US



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2-16

<http://www.mapquest.com/directions/main.adp?do=prt&mo=ma&2si=navt&1gi=0&un=m&go=1&2gi=0...> 1/16/2006

<http://www.mapquest.com/directions/main.adp?do=prt&mo=ma&2si=navt&1gi=0&un=m&go=1&2gi=0...> 1/16/2006

Rev. 2
06/05/10

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Driving Directions from Tooele, UT to 50 N Medical Dr, Salt Lake City, UT



Start: Tooele, UT US
End: 50 N Medical Dr
Salt Lake City, UT 84132-0001, US

Notes:

Directions **Distance**

Total Est. Time: 49 minutes **Total Est. Distance:** 38.14 miles

 1: Start out going WEST on E VINE ST toward UT-36 / S <0.1 miles MAIN ST.	
 2: Turn RIGHT onto UT-36 / N MAIN ST. Continue to follow UT-36.	11.5 miles
 3: Merge onto I-80 E toward SALT LAKE.	20.8 miles
 4: Keep RIGHT at the fork in the ramp.	0.5 miles
 5: Stay STRAIGHT to go onto W 600 S / UT-269 E. Continue to follow W 600 S.	1.6 miles
 6: W 600 S becomes MARTIN LUTHER KING JR BLVD.	0.2 miles
 7: Turn LEFT onto S 700 E / UT-71. Continue to follow S 700 E.	0.9 miles
 8: Turn RIGHT onto E SOUTH TEMPLE.	1.0 miles
 9: Enter next roundabout and take 1st exit onto FEDERAL WAY.	0.1 miles
 10: Turn RIGHT onto S WOLCOTT ST.	<0.1 miles
 11: Turn LEFT onto E 100 S.	<0.1 miles
 12: E 100 S becomes NORTH CAMPUS DR.	0.7 miles
 13: NORTH CAMPUS DR becomes N MEDICAL DR.	0.1 miles
 14: End at 50 N Medical Dr Salt Lake City, UT 84132-0001, US	

Total Est. Time: 49 minutes **Total Est. Distance:** 38.14 miles

<http://www.mapquest.com/directions/main.adp?do=prt&mo=ma&2si=navt&1gi=0&un=m&go=1&2gi=0&1c=Tooele&1g=dQ0...> 1/16/2006

Page 1 of 2

Driving Directions from Tooele, UT to 50 N Medical Dr, Salt Lake City, UT

Page 2 of 2



Start: Tooele, UT US
End: 50 N Medical Dr
Salt Lake City, UT 84132-0001, US



These directions are information only. No representation is made or warranty given as to their content, road conditions or route suitability or expected travel time. User assumes all risk of use. MapQuest and its suppliers assume no responsibility for any loss or delay resulting from such use.

<http://www.mapquest.com/directions/main.adp?do=prt&mo=ma&2si=navt&1gi=0&un=m&go=1&2gi=0&1c=Tooele&1g=dQ0...> 1/16/2006

Figure 2-4. Directions to University of Utah Hospital

2-17

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3.0 BACKGROUND AND SITE DESCRIPTION

3.1 BACKGROUND

The OB/OD area has been used since the 1940s for demilitarization activities, including munitions detonation, propellant flashing and disposal of various materials by burning and/or burial. Past activities included burning munitions and other items in open trenches. Trenches were backfilled when they became full. Burning is no longer conducted in open trenches. The OB/OD area is currently used for routine and emergency demilitarization of bombs and other explosive munitions.

A RCRA Subpart X Permit Application was completed in November of 1988 for the OB/OD area at TEAD-N. In 1995 TEAD requested RCRA permitting support from the US Army Environmental Center (USAEC). The USAEC tasked the Mobile District Corps of Engineers to provide this support to TEAD. TtNUS is under contract to the Mobile District to provide permitting support.

A baseline site investigation for the OB/OD area began on July 7, 1997 and was conducted in three stages corresponding to the media of concern. Surface soil and sediment sampling was conducted from July 7 to 12, 1997. A total of 81 composite surface soil/sediment samples (including 9 duplicates) were collected and analyzed from explosives, SVOCs, metals, cyanide, and field screening TNT. Eight composite samples were collected from each exposure area. A total of 24 discrete subsurface soil samples were collected from four soil borings to establish background conditions. Borings were also taken from total of eight OD pits. One monitoring well was installed MW-01 downgradient of the OB/OD area and the samples were analyzed for total metals, cyanide, explosives, and SVOCs. Chemicals of Potential Concern (COPCs) were developed for the media. Aluminum, arsenic, cadmium, chromium (total), copper, lead, 2,4,6-TNT, RDX, dibenz(a,h)anthracene, hexachlorobenzene, and pentachlorophenol were COPCs for surface soil. Arsenic, beryllium, cadmium, chromium, 2,4,6-TNT, and RDX for COPCs for subsurface soil. Groundwater COPCs include lead, zinc and bis(2-ethylhexyl)phthalate.

Permit support services currently requested from TtNUS by TEAD are for surface soil sampling at the TEAD OB/OD area, in support of its interim status permit.

3.2 SITE DESCRIPTION

TEAD is located in Tooele Valley, Tooele County, Utah, approximately 35 miles southwest of Salt Lake City. The site location is indicated in Figure 3-1. The OB/OD area is located in the southwestern corner of TEAD and consists of three regulated units; a detonation area (OD unit), a burn area (OB unit), and Static Fire unit. OB activities at TEAD have occurred on 15 burn pads at the OB unit within the demolition range. A maximum of 12 burn pans are used per day, with a maximum of two burns conducted per pan per day. There are approximately 120 burn days per year and the maximum amount burned for any single event is currently 1,000 pounds net explosive weight (NEW) per pan (TEAD, 1998). Currently, only burn pans 1-5 are being used.

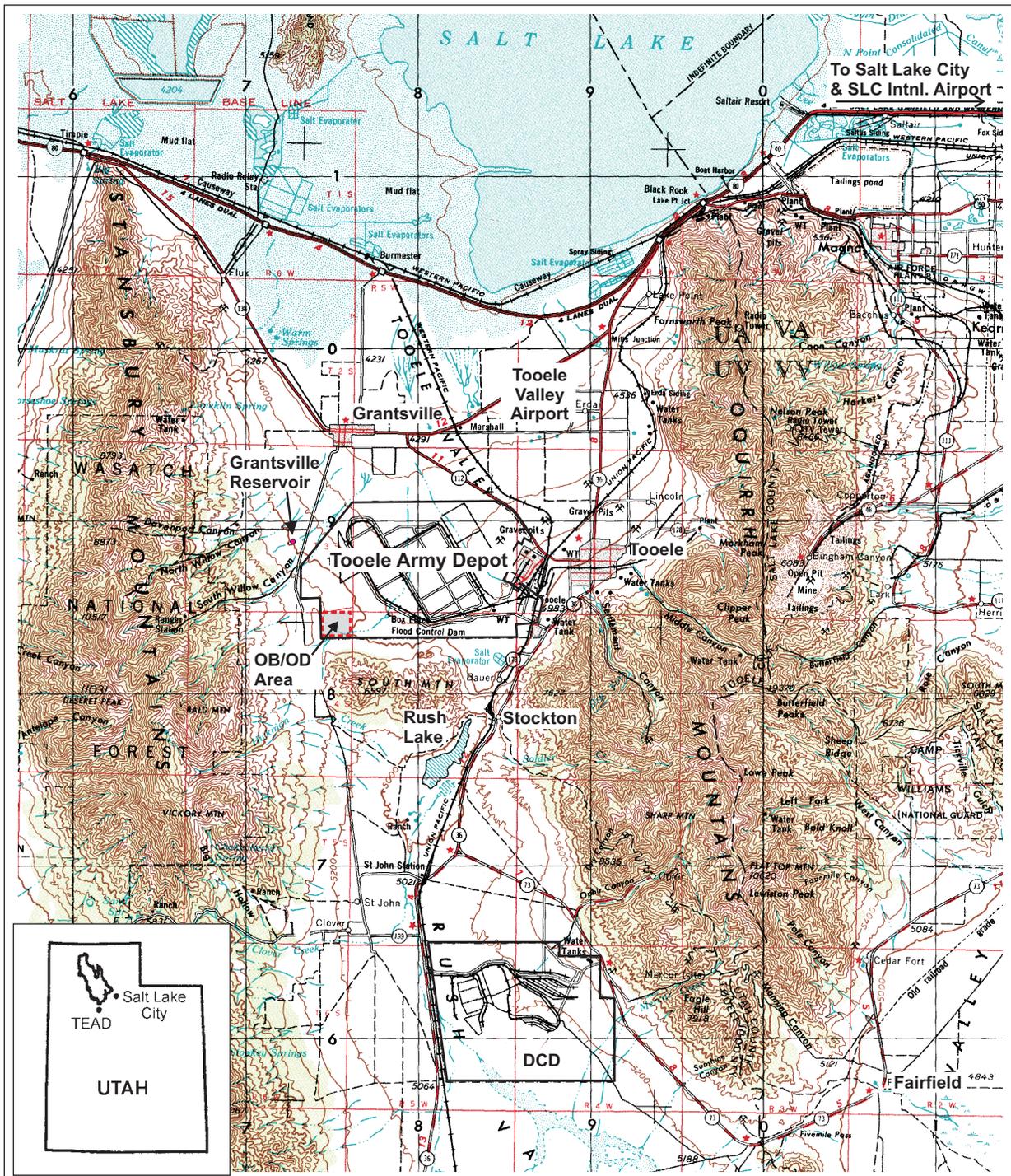
The OD process at TEAD has been conducted in 19 subsurface pits. The depth of the pits are determined by the quantity of munitions to be treated. There are approximately 120 OD days per year and the maximum amount detonated for any single event is currently 750 pounds NEW per pit. This maximum weight limit for explosive materials has been in place since 1996 (TEAD, 1998). Between 1992 and 1996 the maximum amount detonated allowed for any single event was 1,500 pounds NEW. Prior to 1992, TEAD allowed a maximum detonation limit of up to 3,000 pounds per pit. Currently, only pits 1-10, and 12-16 have been in use. In addition, "static firing" is conducted in six silos, with a maximum of four firings of each silo per day and a maximum NEW per silo of 755 pounds (ATSDR, 2003).

OB/OD activities are not conducted year round because of the frequent and long-lasting temperature inversions that occur in winter months. Typically OB/OD operations occur from April to November. The materials treated by OB/OD are solids.

Topography at TEAD is characterized by gently sloping surfaces dissected by a series of intermittent stream channels. The OB/OD area lies within an erosional dissection of a delta

formed in the Pleistocene Lake Bonneville. Unconsolidated alluvial and lacustrine deposits lie beneath most of TEAD. These sediments consist of clay and silt interbedded with sand, gravel, and cobbles. Based on a nearby boring, the OB/OD area is underlain by sands and gravels with a clayey silt layer, encountered between 146 and 193 ft below ground surface (bgs) (ERTEC, 1982). The valley fill overlies Paleozoic limestone, quartzite, and sandstone formations.

The current permit support services requested by TEAD include the collection of surface soil samples from various exposure areas associated with the OB/OD area. Fifteen composite samples will be collected from the OD source zone (one from each of the pits excluding Pit 11). Figure 3-2 shows the OD sample locations. Five composite soil samples will be collected from the OB source zone (burn pans). Figure 3-3 shows the OB sample locations. Six composite surface soil samples will be collected from the area adjacent to the six missile firing silos. Figure 3-4 shows the static missile firing silo sample locations. Based on the implementation of EPA Method 8330B, thirty micro-incremental samples (MIS) will be strategically selected for each composite soil sample mentioned above. The collection of the thirty aliquots of soil will provide greater coverage of the source areas and will provide a better representation of soil conditions.



Source: USGS Tooele, Utah, 1° X 2° Quadrangle, 1970



Figure 3-1

TEAD Location Map

March 2010

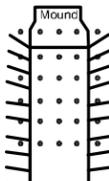
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Project: TO 0003

Figure 3-2

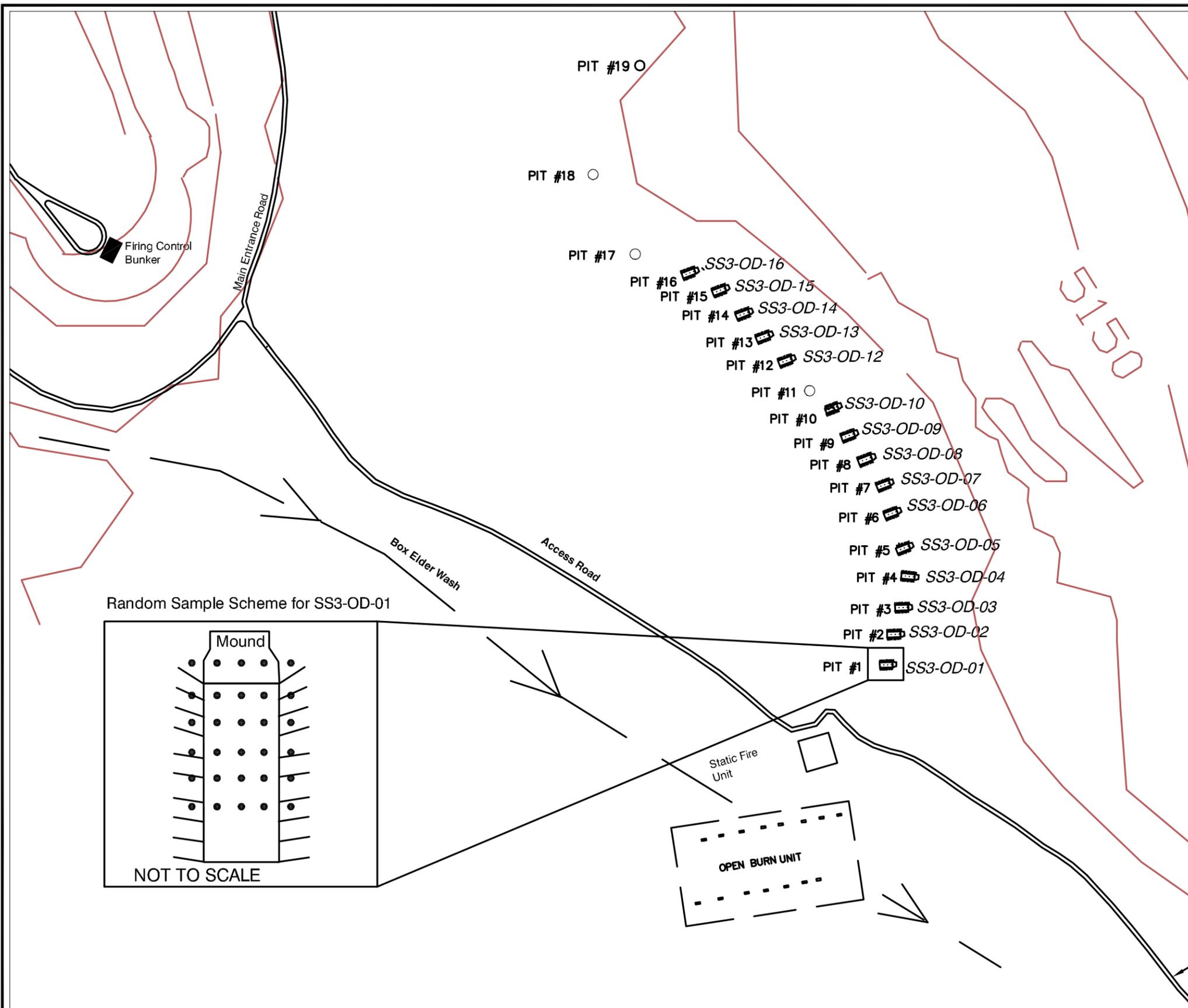
**OD Unit
 Surface Soil
 Sample Locations**

Legend

- Discrete Soil Sample Location for Composite Sample
-  Sampled OD Pits Composite Locations
- OD Pits



November 2009 REV 0 PROJECT: TO 0003



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Figure 3-3

OB Unit Surface Soil Sample Locations

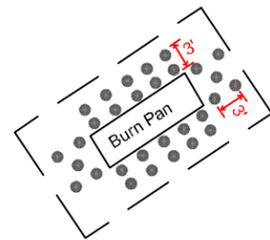
Legend

- Discrete Soil Sample Locations with Respect to Composite Sample
- Burn Pan



Random Sample Scheme for SS3-OB-01

Note: Source Exposure Area
(3' Perimeter from Burn Pan)



NOT TO SCALE

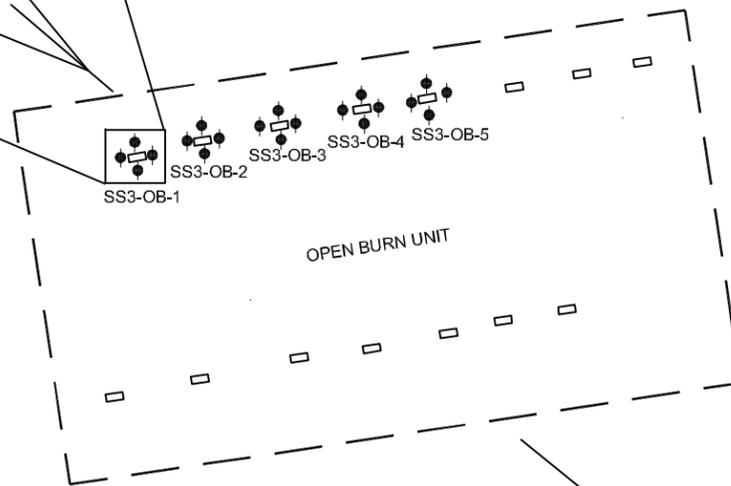
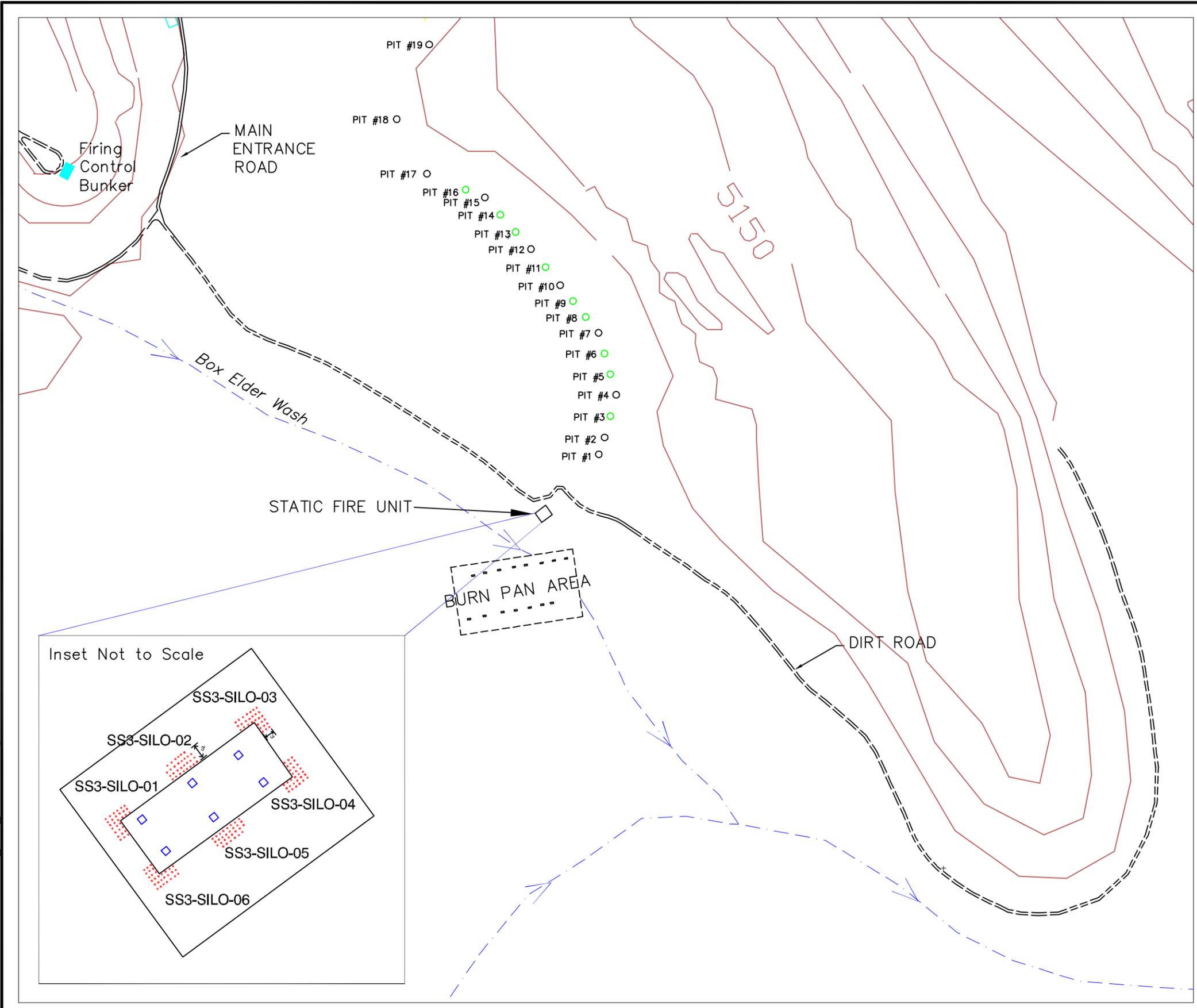
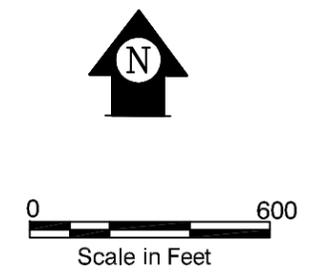


Figure 3-4 Static Fire Unit Surface Soil Sample Locations



- #### Legend
- Discrete Soil Sample Location for Composite Sample
 - Silo Location



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4.0 FIELD OPERATIONS

4.1 FIELD OPERATIONS SUMMARY

The following activities represent actions to be taken as part of the planned onsite sampling activities. These activities have been subdivided into their respective areas of operation.

- Mobilization/Demobilization - This task includes, but is not limited to, the following:
 - The procurement and shipping, packing and unpacking of equipment, and materials for the field investigation.
 - Review of planning documents (i.e., SSHP, SAP, Quality Assurance Plan, etc.).
 - Site Reconnaissance to include site characterization, site preparation, the layout of sampling locations and isolate physical hazards, where applicable.
- UXO detection - Prior to any sampling, the TEAD EOD personnel will visually inspect travel lanes and sample locations. During this activity the EOD personnel will also complete a metal sweep of these areas. The purpose of this activity is to detect UXO and to remove any physical hazards (metal shards) from these areas.
- Surface soil sampling – This activity will proceed as follows:
 - TtNUS personnel will remove any debris from the surface. Soils will be collected from approximately the top 2.0 to 5.0 centimeters (cm) of the ground using disposable spoons to collect and composite sample materials from within the sample grid areas.

- OD Pits
 - o Fifteen composite samples – One composite from each pit excluding Pit 11. 30 multi-incremental samples will be collected from within each pit. See Figure 3-2 for OD Sample Locations.

- OB Pans
 - o Five composite soil samples will be collected from the OB source zone (burn pans). These composite samples will each be composed of 30 multi-incremental samples collected from the four sides of each pan. See Figure 3-3 shows the OB sample locations.

- Silos
 - o Six composite soil samples will be collected from the area adjacent to the concrete pad where each of the six static fire silos is located. These composite samples will each be composed of thirty multi-incremental samples collected from within a three-foot area off the edge of the concrete pad where the silos are co-located. Figure 3-4 shows the static fire silo sample locations.

The proposed surface soil sampling strategy is based on the field sampling and laboratory analysis presented in newly revised SW-846 EPA Method 8330B *Nitroaromatics, Nitroamines and Nitrate Esters by High Performance Liquid Chromatography* and the *Guide for Characterization of Sites Contaminated with Energetic Materials* (Thiboutot, S.G. Ampleman and A.D. Hewitt, 2004, ERDC/CRREL TR-02-1, U.S. Army Engineer Research and development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH. 2002). The EPA Method 8330B Method incorporates a multi-incremental sampling (MIS) approach which uses the advantages of more spatial coverage and an increased sample mass to overcome the problems associated with sample heterogeneity. The procedures for MIS are specifically designed to minimize sampling error and provide a more scientifically-representative mean concentration of the contaminant(s) present in the decision unit (DoD, 2008).

Following the EPA Method 8330B recommendations, a sample of 1kg comprised of 30 evenly spaced 1-2 ounce soil aliquots (i.e increments) will be collected from approximately the top 2.0 to 5.0 centimeters (cm) of the ground. The EPA Method 8330B Manual is presented in Appendix E of the SAP for reference.

For this investigation the OB/OD area at TEAD has been divided into the following exposure units:

- OD Pits Source zone/exposure Unit (OD pits).
- OB Pans Source zone/exposure Unit (soils within 3 ft of burn pans).
- Static Fire Source zone/exposure Unit (soils within 3 ft of concrete missile firing silos).

Prior to collecting any samples, a grid will be marked out at each sample location using either a tape measures and/or survey pin flags to located the 30 composite sample points. Soil samples will be composited from each of these 30 locations for laboratory analysis.

Surface soil sample locations may be revised annually based on previous sampling results and OB/OD operations during the previous year with approval from the State of Utah Department of Environmental Quality.

- Groundwater sampling – This activity will proceed as follows:
 - One well will be sampled using low flow techniques with the Bennett Piston Pump currently in place in the well.
 - The well is between 750 and 800 feet deep. The water is usually around 660 feet.
 - Samplers will install fittings on current tubing in the well. Nitrogen gas will be pumped into the well to in order to purge the well.

The above list represents a summary of the identified tasks as they apply to the scope and application of this SSHP. For a more detailed description of the associated tasks, see the Sampling and Analysis Plan (SAP) to be maintained onsite.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES

Table 5-1 of this section is intended to assist project personnel in the recognition of hazards and recommended control measures necessary for each planned task to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which personal protective equipment (PPE) and decontamination procedures are to be used as well as appropriate air monitoring techniques and action levels.

Safe Work Permits will be issued for site activities (See Section 9.2 and Appendix E). The FOL and/or the SHSO will use the elements defined in Table 5-1 as the primary reference for completing the Safe Work Permit adding additional information as warranted.

The HSGM may be consulted for additional information in these areas as it pertains to SOPs, safe work practices, and reference information.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices identified in this section, the following safe work practices (SWP) are to be followed when conducting work on-site. These safe work practices address a pattern of general precautions and measures for reducing risks associated with site operations. This is a partial list and may be amended as necessary.

- Eating, drinking, chewing gum or tobacco, taking medication, or smoking is prohibited in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.
- Wash hands and face thoroughly using soap and water or hygienic wipes for remote areas, upon leaving a contaminated or suspected contaminated area. The contaminants of concern are particulate of particulate bound materials. Inhalation of dusts and ingestion through hand to mouth contact could potentially facilitate exposure.

- Attend briefings on anticipated hazards, equipment requirements, safe work permits, emergency procedures, and communication methods before going on-site.
- Rehearse unfamiliar operations prior to implementation.
- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.
- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.
- Immediately report injuries, illnesses, and unsafe conditions, practices, defective equipment, and potential exposure incidents to the SHSO.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
TEAD, TOOELE, UTAH
PAGE 1 OF 3**

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SHSO require.)</i>	Decontamination Procedures
<p>Mobilization/ Demobilization</p> <p>This activity includes, but not limited to:</p> <ul style="list-style-type: none"> - Equipment Preparation and Evaluation - Resource acquisition and unpacking of supplies 	<p>Chemical hazards:</p> <p>1) Contaminant exposure – None anticipated</p> <p>Potential chemical hazards are associated with those chemicals brought on-site. Exposure to site contaminants is unlikely during this task.</p> <p>Physical hazards:</p> <p>2) Lifting (strain/muscle pulls)</p> <p>3) Cuts and lacerations</p> <p>4) Pinches and compressions/Struck by</p> <p>5) Slips, trips, and falls</p> <p>Natural hazards:</p> <p>6) Ambient temperature extremes (heat/cold stress)</p> <p>7) Inclement weather</p>	<p>1) The on-site Hazard Communication Program (Section 5.0 TtNUS Health and Safety Guidance Manual) will be followed. This effort shall include</p> <ul style="list-style-type: none"> - Accurate Chemical Inventory List (Entries will match chemicals brought on-site, as the names appear on the MSDS and the label) This list will also contain quantities and storage locations. - MSDS's will be maintained in a central location available to all personnel. - All containers will have labels specifying the following information: <ul style="list-style-type: none"> --Chemical Identity (As it appears on the label, MSDS, and Chemical Inventory List) --Appropriate Warning (i.e., Eye and skin irritation, flammable, etc.) --Manufacturer's Name Address and Phone Number <p>It will be the FOL and/or the SHSO's responsibility to insure this is completed. All personnel will be required to review the appropriate MSDS's, prior to the use of a specified chemical substance. This direction should also be communicated on the Safe Work Permit completed for this task. Any specific provisions recommended by the MSDS shall be in place (i.e., eye wash, fire extinguisher, specified PPE, etc.) prior to using the chemical substance.</p> <p>2) During mobilization/demobilization personnel are required to handle equipment, supplies, and resources in preparation for site activities. This hazard becomes more predominant in the early morning hours (prior to muscles becoming limber) and later in the day (as a result of fatigue). The following provisions shall be instituted in order to minimize hazards of this nature:</p> <ul style="list-style-type: none"> - Where possible, use machinery or multiple personnel for heavy lifts. - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are obtainable. - Minimize the horizontal distance to the center of the lift to your center of gravity. - Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. Ensure there is adequate room to lift and maneuver the load. Ensure the area of the lift is free of work place clutter, slippery surfaces, etc. - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. - Plan your lifts - Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. <p>3) To prevent cuts and lacerations associated with unpacking or packing equipment and supplies, during site preparation (clearing access routes), the following provisions are required:</p> <ul style="list-style-type: none"> - Always cut away from yourself and others, then, if a knife slips, you will not impale yourself or others. - Do not place items to be cut in your hand or on your knee. - Change out blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting attachments. <p>If hand tools (brush hooks, machetes, etc.) are used to gain access to sample locations, the following precautions are recommended:</p> <ul style="list-style-type: none"> - Insure handles are of good construction (no cracks, splinters, loose heads/cutting apparatus). - Insure all cutting tools are maintained. Blades shall be sharp without nicks and gouges in the blade. - All hand tools (brush hooks, machetes, etc.) with cutting blades shall be provided with a sheath to protect individuals when not in use and when carrying these items over rough or slippery terrain. <p>4) Do not modify tooling without manufacturer's expressed permission.</p> <ul style="list-style-type: none"> - Keep any machine guarding in place, avoid moving parts. - Use tools or equipment where necessary to avoid placing hands in areas vulnerable to pinch points. - Adjust machine guarding as necessary to minimize distance between guards and point of operation. - When staging equipment, insure all stacked loads, shelving, are adequately secure to avoid creating a hazard from falling objects. <p>5) Preview work locations for unstable/uneven terrain.</p> <ul style="list-style-type: none"> - Cover, guard and barricade all open pits, ditches, and floor opening, as necessary. - As part of site control efforts fences shall be constructed to control and isolate traffic in the work area. Fences shall also be constructed isolating resource or staging areas. - The FOL and the SHSO during site surveys and site preparation should identify these potential hazards. - All activities conducted greater than 6-feet above ground surface shall employ acceptable engineered fall protection (i.e. handrails and platforms) or accepted fall protection harnesses. <p>6) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat and cold stress is provided in Section 4.0 of the TtNUS Health and Safety Guidance Manual.</p> <p>7) Suspend or terminate operations until directed otherwise by SSO. See Section 4.6 of the TtNUS Health and Safety Guidance Manual for additional information concerning natural hazards.</p>	<p>No air monitoring is necessary while performing these tasks. However, visual observation of work practices will be used by the FOL and/or the SHSO to identify potential physical hazards (i.e., improper lifting, unsecured loads, cutting practices, etc.).</p>	<p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - <i>Safety glasses</i> - <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i> - <i>Reflective vest for high traffic areas</i> - <i>Hearing protection for high noise areas (As directed on an operation by operation scenario or at the direction of the FOL and/or the SHSO).</i> <p>As site conditions may change, the following equipment will be maintained during all on-site activities as prescribed in Section 2.0 of this HASP</p> <ul style="list-style-type: none"> - Fire Extinguishers - First-aid kit <p>Note: <i>The FOL and/or the SHSO shall determine the number of fire extinguishers and first-aid kits to be made available based on the number of remote or separated operations to be conducted at any given time.</i></p>	<p>Not required.</p> <p>Good personal hygiene practices should be employed prior to lunch breaks or other periods when hand to mouth contact occurs.</p>

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
TEAD, TOOLE, UTAH
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Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SHSO require.)</i>	Decontamination Procedures
<p>Surface soil sampling within Open Detonation pits; around Open Burn pans; surrounding disposal silos.</p> <p>Samples will be collected using stainless steel spoons and bowls.</p>	<p>1) Previous analytical data identified the following compounds as contaminants of concern (Dust/particulate contaminants)</p> <p>Soils (Surface)</p> <p>Metals – Aluminum, arsenic, cadmium, chromium (total), copper, lead, dibenz(a,h)anthracene, hexachlorobenzene, and pentachlorophenol</p> <p>Subsurface soils Arsenic, beryllium, cadmium, chromium, 2,4,6-TNT, and RDX.</p> <p>Energetics</p> <p>RDX; 2,4,6-TNT</p> <p>Further information on these contaminants are presented in Section 6.3, Table 6-1.</p> <p>2) Transfer of contamination into clean areas.</p> <p>Physical hazards:</p> <p>3) UXO Hazards</p> <p>4) Cuts and Lacerations</p> <p>5) Slip, trip, and fall hazards</p> <p>6) Strain/muscle pulls from manual lifting</p> <p>7) Ambient temperature extremes (heat/cold stress)</p> <p>Natural hazards:</p> <p>8) Animal and insect bites and encounters</p> <p>9) Inclement weather</p>	<p>1) As a general rule, minimizing contact with contaminated media (air, water, soils, etc.) will be employed as a universal control measure. <i>Particulates</i> -As the materials in question are solids (i.e., metals, energetics, PAHs) and/or bound to particulates, the next control measure to be employed to minimize potential exposure will be good work and personal hygiene practices. These control measures including avoiding hand-to-mouth contact to the extent possible, washing hands and face or using hygienic wipes to remove potential contaminants from hands and face prior to breaks or lunch or other hand to mouth activities will restrict the most predominant route of exposure. It should be noted that based on the reported concentrations within the surface soil media, that sufficient concentrations do not exist that would present a significant occupational exposure threat through inhalation. However, if the assumption regarding surface soil sampling not generating significant airborne dusts is incorrect area wetting will be used to control visible dust emission.</p> <p>2) The following measures will be incorporated to minimize transfer of contamination into clean areas.</p> <ul style="list-style-type: none"> - Employ drop pads or similar devices to control contamination of clips boards, paperwork, etc. - Employ good work hygiene practices during sample collection. <p>3) All initial entry pathways and established pathways shall be cleared by an EOD-Qualified Technician.</p> <ul style="list-style-type: none"> - An EOD-Qualified Technician shall preview all sample media and sample acquisition locations in areas of possible UXO concerns. - All personnel shall practice UXO avoidance techniques including the following: <ul style="list-style-type: none"> --Do not to pick up, kick or otherwise harass unknown items or debris on the ground. --If you encounter items that show wires or other means of activation, mark it using pins flags or other identifier, report the item(s) to the EOD-qualified Technician for assessment. --Stay within established travel lanes and sample locations. Do not stray for any reason. <p>See Section 4.8 of the HSGM for additional safe work practices concerning unexploded ordnance.</p> <p>4) EOD Technician will remove visible metal shards (to the extent possible) from within the travel lanes and sample locations.</p> <ul style="list-style-type: none"> - Personnel shall wear knee pads to when kneeling collecting the samples. This will prevent possible puncture and lacerations caused by metal shards on or just below the surface. - Carry all glassware and items that present a potential for cuts, lacerations, or impalement in protective packaging (such as a cooler) or sheathed to avoid breakage or exposure in the event of a slip, trip, and/or fall. <p>See Section 4.13 of the HSGM for additional safe work practices to minimize and/or eliminate cuts and lacerations hazards.</p> <p>5) Maintain proper housekeeping in all work areas.</p> <ul style="list-style-type: none"> - Preview and inspect work areas to identify and eliminate slip, trip, or fall hazards. - Travel lanes selected (to the extent possible) will select routes avoiding deep depressions, unstable terrain; areas where obvious physical hazards exist. - Use multiple persons and pack small loads to remote locations. <p>See Section 4.1 of the HSGM for additional safe work practices to minimize and/or eliminate slip, trips, and fall hazards.</p> <p>6) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. See Section 4.4 of the HSGM for additional safe work practices to minimize and/or eliminate strains/muscle pulls from manual hazards.</p> <ul style="list-style-type: none"> - Use multiple persons and pack small loads to remote locations. <p>7) This activity is slated for February/March/April time frame. Therefore, cold weather conditions are anticipated. To combat hazards of this nature the following practices will be incorporated into this activity.</p> <ul style="list-style-type: none"> - Wear appropriate clothing for weather conditions. Cold weather dress in layers of breathable materials that will wick sweat away from the body. - Establish a work warming regimen as necessary to allow warming. - Provide acceptable shelter and liquids for field crews. <p>Additional information regarding heat/cold stress is provided in Section 4.6 of the Health and Safety Guidance Manual.</p> <p>8) This is not considered a significant hazard given the time of the year. However, as the areas to be sampled are remote and cannot be ruled out. To combat the potential impact of natural hazards, the following actions are recommended:</p> <ul style="list-style-type: none"> - Avoid nesting areas – Underbrush, groundcover, etc. Preview routes, avoid nests, if at all possible. - Clothing articles work boots, coveralls left at the site make prime nesting areas for spiders and insects. Shake out boots, and coveralls before using. - Snakes – Do not harass or try to capture; report these hazards to the FOL/SHSO. <p>For additional safe work practices concerning natural hazards, see Section 4.0, (subsection 5.0) of the HSGM.</p> <ul style="list-style-type: none"> - Report potential hazards to the SHSO. <p>9) Suspend or terminate operations until directed otherwise by the SHSO. See Section 4.6 of the HSGM for additional safe work practices pertaining to inclement weather.</p>	<p>Air monitoring to quantify airborne contaminants will not be conducted in support of this task. This decision was based on</p> <ul style="list-style-type: none"> - Surface soil sampling will not mechanically generate appreciable amounts of airborne dusts. - Source concentrations of these particulates are considered low, thereby not representing a significant exposure threat via inhalation. - The contaminants in question are particulate based. Instrument sufficient to measure airborne concentrations cannot provide identification. <p>As indicated above airborne dusts are visible when airborne concentrations reach 2mg/m³. Therefore, this will be our action levels to use area wetting to control dust emissions.</p>	<p>Level D protection will be utilized for the following sampling activities</p> <p>Surface soil sampling:</p> <p>Sampling Personnel</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants), appropriate clothing for conditions - Safety shoes (steel toe/shank) - Safety glasses - Surgical style gloves (<i>double-layered, if necessary</i>) <i>It is recommended that cotton liner gloves be employed under surgeons gloves to provide warmth and wick sweat generated.</i> - <i>Orange Safety Vests</i> - <i>Tyvek coveralls and disposable boot covers, if surface contamination is present or if the potential for soiling work attire exists.</i> <p>Note: The Safe Work Permit(s) for this task (See Appendix E) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination</p> <p>Soil Sampling, the following provisions will apply</p> <ul style="list-style-type: none"> - Upon completion of the sampling dedicated trowels, bowls, etc. will be bagged for transport back to the central drum storage area. - PPE (gloves) will be removed and also bagged for disposal. - Handi-Wipes or similar product will be used to clean hands, prior to moving to the next location.

**TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
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Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment <i>(Items in italics are deemed optional as conditions or the FOL or SHSO require.)</i>	Decontamination Procedures
<p>Groundwater sampling</p> <p>Samples will be collected using Bennett Piston Pump currently in well.</p>	<p>1) Information from past site activities indicate possible low concentrations of VOC's, SVOC and metals. None of the previously identified contaminants of concern are likely to present a significant occupation exposure threat to site workers. As a precautionary measure, air monitoring will be used to detect the presence of detectable compounds and VOCs.</p> <p>Further information on these contaminants are presented in Section 6.3, Table 6-1.</p> <p>2) Transfer of contamination into clean areas.</p> <p>Physical hazards:</p> <p>3) Slip, trip, and fall hazards</p> <p>4) Strain/muscle pulls from manual lifting</p> <p>5) Ambient temperature extremes (heat/cold stress)</p> <p>Natural hazards:</p> <p>6) Animal and insect bites and encounters</p> <p>7) Inclement weather</p>	<p>1) Minimize contact with contaminated media (air, water, soils, etc.). Avoid contact with media that may contain site contaminants. Use PPE and appropriate safe work practices to minimize contact with site contaminants and sample preservatives. Real-time monitoring instrumentation and conservative action levels will be used to detect the presence of the contaminants of concern and VOCs which are unlikely to be present in ambient air.</p> <p>2) Use drop pads or similar devices to control contamination of clips boards, paperwork, etc.</p> <ul style="list-style-type: none"> - Practice good work hygiene during sample collection. <p>3) Maintain proper housekeeping in all work areas.</p> <ul style="list-style-type: none"> - Preview and inspect work areas to identify and eliminate slip, trip, or fall hazards. - Travel lanes selected (to the extent possible) will select routes avoiding deep depressions, unstable terrain; areas where obvious physical hazards exist. - Use multiple persons and pack small loads to remote locations. <p>See Section 4.1 of the HSGM for additional safe work practices to minimize and/or eliminate slip, trips, and fall hazards.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. See Section 4.4 of the HSGM for additional safe work practices to minimize and/or eliminate strains/muscle pulls from manual hazards.</p> <ul style="list-style-type: none"> - Use multiple persons and pack small loads to remote locations. <p>5) To combat hazards of this nature the following practices will be incorporated into this activity.</p> <ul style="list-style-type: none"> - Wear appropriate clothing for weather conditions. Cold weather dress in layers of breathable materials that will wick sweat away from the body. - Establish a work warming regimen as necessary to allow warming. - Provide acceptable shelter and liquids for field crews. <p>Additional information regarding heat/cold stress is provided in Section 4.6 of the Health and Safety Guidance Manual.</p> <p>6) To combat the potential impact of natural hazards, the following actions are recommended:</p> <ul style="list-style-type: none"> - Avoid nesting areas – Underbrush, groundcover, etc. Preview routes; avoid nests, if at all possible. - Clothing articles work boots, coveralls left at the site make prime nesting areas for spiders and insects. Shake out boots, and coveralls before using. - Snakes – Do not harass or try to capture; report these hazards to the FOL/SHSO. <p>For additional safe work practices concerning natural hazards, see Section 4.0, (subsection 5.0) of the HSGM.</p> <ul style="list-style-type: none"> - Report potential hazards to the SHSO. <p>7) Suspend or terminate operations until directed otherwise by the SHSO. See Section 4.6 of the HSGM for additional safe work practices pertaining to inclement weather.</p>	<p>It is anticipated that potential contaminant concentrations at this outdoor sample location will not present an inhalation hazard.</p> <p>A direct reading Photoionization Detector (PID) with a 10.6 eV lamp source (or equivalent) will be used to screen samples and to detect the presence of any potential volatile organics which have not been previously detected at concentrations that are likely to produce detectable airborne concentrations.. Source monitoring of the borehole will be conducted at each sampling interval or at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions:</p> <ul style="list-style-type: none"> - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above background levels in the workers breathing zone will indicate an unanticipated condition and will require site activities to be suspended and site personnel to report to an unaffected area. Contact the PHSO for additional guidance. - Work may only resume if airborne readings in worker breathing zone return to background levels. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. 	<p>Level D protection will be utilized for the initiation of all sampling activities.</p> <p>Level D -(Minimum Requirements)</p> <ul style="list-style-type: none"> - Standard field attire (Sleeved shirt; long pants) - Steel toe safety shoes/boots - Safety glasses - Surgical style gloves (double-layered if necessary) - <i>Reflective vest for high traffic areas</i> - <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i> - <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i> - <i>Hearing protection for high noise areas, or as directed on an operation by operation scenario</i> <p>Note: The Safe Work Permit(s) for this task (See Appendix E) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination</p> <p>Soil Sampling, the following provisions will apply</p> <ul style="list-style-type: none"> - Upon completion of the sampling dedicated trowels, bowls, etc. will be bagged for transport back to the central drum storage area. - PPE (gloves) will be removed and also bagged for disposal. - Handi-Wipes or similar product will be used to clean hands, prior to moving to the next location.

6.0 HAZARD ASSESSMENT

6.1 CONTACT WITH ENERGETIC MATERIAL

The most significant hazard associated with the execution of this scope of work is the potential for encountering UXO/MEC/DMM disposed of during OB/OD operations. Because the consequences are severe, extreme caution and adherence to established procedures to detect, identify, and take evasive actions will be followed. These are as follows:

- Traffic/travel lanes and sample locations will be visually and magnetically cleared before permitting TtNUS personnel into the areas.
- Personnel will stay within designated travel lanes and sample areas identified using pin flags. Traffic lanes will be cleared to a sufficient size to permit emergency vehicle access.
- Site operations will be suspended if so ordered by the TEAD Escort or authorized client representative (i.e., Installation Range Control and/or Safety Office).
- Site operations will be suspended and personnel will evacuate to the assembly point (Range Control) if any site worker encounters an item of suspected UXO/MEC/DMM. Site work will remain suspended until the item is inspected and cleared by the TEAD EOD Technician.
- See Section 4.8 of the HSGM for additional safe work practices pertaining to UXO hazards and control measures.

The methods associated with the detection, identification, handling, and/or avoidance for these activities are discussed in detail in the procedure developed for UXO-related operations to USACE activities. A copy of this procedure is attached in Appendix B of this SSHP.

6.2 CHEMICAL HAZARDS

Chemical exposure is considered minimal during the soil sampling activity. This assumption is based on several factors. These are as follows:

- One of the primary controlling factors is source concentration. Surface soil concentrations are not considered excessive. Therefore, in order to accomplish exposure there would have to be a sufficient concentration in the surface soil that could be mobilized to facilitate exposure, which there is not.
- Mechanical generation - As the contaminants of concern are particulates or bound to particulates, site personnel would have to mechanically generate enough dust to facilitate exposure through inhalation/ingestion. During soil sampling significant dust concentrations are not generated because a very small area is disturbed.
- Work Hygiene Practices - The next factor relating to exposure would require site personnel to prevent the introduction of contaminants into their body. Because, hand to mouth contaminant transfer is possible good work hygiene practices have been incorporated into this planning document as well as PPE and safe work practices to reduce or eliminate potential exposures to control this hazard.

See Table 6-1 for additional information concerning the chemical, toxicological, and physical properties of the contaminants of concern.

6.3 NATURAL HAZARDS

6.3.1 Insect/Animal Bites and Stings, Poisonous Plants, etc.

Various natural hazards may be encountered within Utah including hobo spiders, scorpions, and the Timber Rattlesnakes. Because the area is considered remote, these hazards cannot be completely ruled out. However, these hazards are considered minimal based on the

time of the year the sampling is to be conducted and where nesting and habitat areas for these insects, spiders and reptiles may be located.

Site personnel who are allergic to stinging insects such as bees, wasps, and hornets must be particularly careful since severe illness and death may result from allergic reactions. As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet (See Appendix D of this SSHP).

Specific information on these hazards are included in Section 4.0, subsection 5.0 of the HSGM. In general, avoidance of areas of known insect infestation or poisonous plant growth will be the preferred exposure control. Good work hygiene practices and diligent use of PPE will also aid in reducing or eliminating these hazards.

Other practices including shaking out boots and clothing (when left at the site) will aid in the prevention of insect and spider bites.

6.3.2 Inclement Weather

This Scope of Work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather (electrical storms, wind storms, etc.) conditions arise, the FOL and/or the SHSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
ENERGETICS							
RDX Synonym: Cyclo-1,3,5-trimethylene-2,4,6-trinitramine; Cyclonite; Trimethylenetrinitramine; T4; RDX	121-82-4	No information found.	Air sampling use particulate filter; gravimetric detection. Sampling and analytical procedures shall be in accordance with NIOSH Method #0500 (Nuisance Dust, Total).	OSHA/NIOSH/A CGIH: 1.5 mg/m ³ (skin); STEL 3 mg/m ³ (skin)	Sensitive to friction, as stable as TNT, explosive when heated to 260°C; 126.6°F Respiratory Protection: Can use air purifying respirator with an organic vapor cartridge for concentrations up to 75 mg/m ³ . Airborne concentrations above this level use an airline respirator or SCBA. Recommended Gloves: Impermeable gloves suitable to prevent skin contact. Nitrile gloves have been selected for most other applications.	Boiling Pt: Not available Melting Pt: Pure 399°F; 204.1°C Military grade ~10% HMX ~374°F; ~190°C Freezing Pt: Not available Solubility: Insoluble in water; soluble hot aniline, phenol, and nitric acid Specific Gravity: 1.2 Vapor Pressure: Not available Flash Pt: Heat (explosion in 5 seconds) 500°F; 260°C LEL: Not available UEL: Not available Incompatibles: Strong oxidizers, combustible materials, mercury fulminate, and heat Appearance and odor: Colorless to white crystalline powder, odorless	Routes of exposure: Inhalation, ingestion, skin and eye contact. Sign and symptoms of overexposure may include: headaches, dizziness, nausea, hyperactivity, convulsions, seizures, fatigue, irritability. These effects may be experienced quickly or several hours later. Topically irritating to skin and eyes.

**TABLE 6-1
 CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
ENERGETICS (continued)							
2,4,6-Trinitrotoluene (TNT) Synonyms: Trinitrotoluene (dry)	118-96-7	PID: Ionization Potential - 10.59 eV, relative response ratio is unknown. FID: Relative response ratio is unknown it is estimated that the response will be slightly less than benzene (150%) or toluene (110%).	Air sample using a Tenax GC tube; Acetone desorption; GC/TEA detection. Sample and analytical protocol in accordance with OSHA Method #44.	OSHA: 1.5 mg/m ³ (skin) ACGIH: 0.5 mg/m ³ (skin) NIOSH: 0.5 mg/m ³ (skin)	Rapid heating to 466°F; 240°C will cause detonation. Pale yellow crystals, subject to detonation by exposure to shock or temperatures exceeding 466°F; 240°C. Air purifying respirators recommended for escape purposes only. Recommended Gloves: Any glove which is impermeable to contact.	Boiling Pt: 466°F; 240°C Melting Pt: 176°F; 80°C Detonation Pt: 464°F; 240°C Solubility: 0.01% at 75°F; 25°C Specific Gravity: 1.65 Vapor Density: 7.8 Vapor Pressure: 0.057 mmHg @ 178°F; 81°C Flash Pt: Explodes 842°F; 450°C LEL: Not available UEL: Not available Incompatibles: Strong oxidizers, ammonia, combustible materials, and heat. Appearance and odor: Colorless to light yellow solid or crushed flakes.	Routes of Exposure: Inhalation, absorption, ingestion, and skin & eye contact. The following symptoms may be experienced: Sneezing, coughing, sore throat, muscle pain, peripheral nerve sensitization, and irritation of the skin and mucous membranes. Chronic exposure may cause liver damage, jaundice, cyanosis, kidney damage, anemia, cataract, leukocytosis.

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CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
METALS							
Arsenic	7440-38-2	Particulate form - This substance is unable to be detected by PID/FID.	Air sample using a particulate filter; acid desorption; AAS detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7900.	OSHA: Organic compounds 0.5 mg/m ³ Inorganic compounds 0.01 mg/m ³ NIOSH: (Ceiling) 0.002 mg/m ³ ACGIH: 0.01 mg/m ³ IDLH: 5 mg/m ³ as arsenic	No identifiable warning properties to indicate presence and thereby detection. Recommended APR Cartridge: Suitable for dust and fume. Organic vapor acid gases with HEPA filter. This substance may be presented as a pesticide, therefore a cartridge suitable for pesticides (MSA-GMP). Recommended Gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: sublimation @ 1134° F; 612°C Melting Pt: 1497°F; 814°C @ 36 atm Solubility: Insoluble in water; soluble in nitric acid Flash Pt: Nonflammable, however, airborne in the form of a dust this substance will support combustion LEL/LFL: Nonflammable UEL/UFL: Nonflammable Vapor Density: Not available Vapor Pressure: 1 mmHg @ 372°C (sublimes) Specific Gravity: 5.73 Incompatibilities: Oxidizers, halogens, zinc, lithium, azides, and acetylides Appearance and odor: Gray to black, brittle, crystalline, amorphous, odorless.	Overexposure to this substance through inhalation or ingestion may result in ulceration of the nasal septum, GI disturbances resulting in violent purging and vomiting, hoarse voice, sore throat, excessive salivation, peripheral neuropathy (numbness and burning sensations beginning at the extremities followed by motor weakness), respiratory irritation leading to possible pulmonary edema. Skin or eye contact may result in irritation, conjunctiva, dermatitis, and hyperpigmentation (darkening of the areas exposed) of the skin. This substance has been judged to be a Human carcinogen by NTP, and IARC.

**TABLE 6-1
 CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
METALS (continued)							
Barium	7440-39-3 as Ba 10022-31-8 as Ba (NO ₃) ₂ 10361-37-2 as Ba Cl ₂	Particulate form - This substance is unable to be detected by PID/FID.	Air sample using particulate filter; water desorption; AAS detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7056.	OSHA; NIOSH; ACGIH: 0.5 mg/m ³ IDLH: 50 mg/m ³	No identifiable warning properties to indicate presence and thereby detection. Recommended APR Cartridge: Suitable for dust and fume. Organic vapor acid gases with HEPA filter. Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: 2984°F 1640°C (decomposes) Melting Pt: 1337°F 725°C Solubility: Varies between compounds 9/38% Flash Pt: Not available (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 10 mmHg @ 1920°F 1049°C Specific Gravity: 3.5 Incompatibilities: Acids, oxidizers Appearance and odor: Silver to white, odorless	Overexposure to this substance results in the solubilization in the water or stomach acids. Symptoms include vomiting, colic, diarrhea (watery sometimes bloody), slow to irregular pulse, transient hypertension, convulsive tremors, and muscular paralysis resulting in stiffness immobility, leg cramps, twitching, and impairment of speech and swallowing. Overexposure to some compounds via inhalation may result in respiratory distress, dyspnea, and baritosis (a benign pneumoconiosis). Direct contact to the skin or eyes may result in irritation.

**TABLE 6-1
 CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
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Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
METALS (continued)							
Chromium Compounds	7440-47-3 (Element)	Not detectable by PID. Not detectable by FID.	Air sample using mixed cellulose - ester filter; acid desorption and analysis by atomic absorption. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7024.	OSHA & NIOSH: (Chromium II, III) 0.5 mg/m ³ (Chromium VI) 0.1 mg/m ³ (Ceiling) ACGIH: 0.5 mg/m ³ (Chromium II, III compounds), 0.05 mg/m ³ (Chromium VI compounds) IDLH: 30 mg/m ³ (Chromium VI compounds)	The use of an air purifying, full face-piece respirator with a high efficiency particulate filter for concentrations up to 0.1 mg/m ³ . Recommended Gloves: This is in particulate form. Therefore any glove suitable to prevent skin contact.	Boiling Pt: 4788°F; 2642°C Melting Pt: 3452°F; 1900°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 7.14 Incompatibilities: Strong oxidizers, peroxides, and alkalis Appearance and Odor: Appearance and odor vary depending upon the specific compound.	Health hazards are characterized normally through chronic exposure manifesting as histologic fibrosis of the lungs and ulceration of the nasal septum and skin. IARC, NTP and ACGIH list various chromium compounds as possessing carcinogenic properties.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
TEAD, TOOELE, UTAH
PAGE 6 OF 8**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
METALS (continued)							
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO ₃ or H ₂ O ₂ desorption; or Atomic absorption detection. NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m ³ ACGIH: 0.05 mg/m ³ NIOSH: 0.10 mg/m ³ IDLH: 100 mg/m ³ as lead	The use of an air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m ³ . Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: 3164°F; 1740°C Melting Pt: 621°F; 327°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 11.34 Incompatibilities: Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids Appearance and Odor: Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.
Mercury	7439-97-6	Jerome Mercury Vapor Analyzer This substance is unable to be detected by PID/FID.	Air sample using Hydrar® sorbent tube; acid desorption; AA cold detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #6009.	OSHA; NIOSH; ACGIH: as alkyl compounds 0.01 mg/m ³ ; STEL 0.03 mg/m ³ IDLH: 10 mg/m ³	No identifiable warning properties to indicate presence and thereby detection. Recommended APR Cartridge: Suitable for Metallic mercury with HEPA filter. Preferably, with an end-of-service life indicator. Recommended gloves: Rubber gloves	Boiling Pt: 674°F; 356.9°C Melting Pt: -38°F; -38.89°C Solubility: Insoluble Flash Pt: Not available LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 0.0012 mmHg @ 77°F; 25°C Specific Gravity: 13.6 Incompatibilities: Acetylene, ammonia, chlorine dioxide, azides, calcium, sodium carbide, lithium, rubidium, and copper Appearance and odor: Silvery-white heavy mobile liquid, odorless	This substance is corrosive to all points of contact. Systemic symptoms include irritability, wakefulness, muscle weakness and tremors, increased reflexes, gingivitis, anorexia, headache, tinnitus, hypermobility, GI disturbances (nausea, vomiting), diarrhea (sometimes bloody), liver changes, dermatitis, and fever. Symptoms experienced via inhalation include to those above coughing, chest pain, dyspnea, bronchial pneumonitis, and excessive salivation.

**TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
TEAD, TOOELE, UTAH
PAGE 7 OF 8**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
METALS (continued)							
Chromium Compounds	7440-47-3 (Element)	Not detectable by PID. Not detectable by FID.	Air sample using mixed cellulose - ester filter; acid desorption and analysis by atomic absorption. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7024.	OSHA & NIOSH: (Chromium II, III) 0.5 mg/m ³ (Chromium VI) 0.1 mg/m ³ (Ceiling) ACGIH: 0.5 mg/m ³ (Chromium II, III compounds), 0.05 mg/m ³ (Chromium VI compounds) IDLH: 30 mg/m ³ (Chromium VI compounds)	The use of an air purifying, full face-piece respirator with a high efficiency particulate filter for concentrations up to 0.1 mg/m ³ . Recommended Gloves: This is in particulate form. Therefore any glove suitable to prevent skin contact.	Boiling Pt: 4788°F; 2642°C Melting Pt: 3452°F; 1900°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 7.14 Incompatibilities: Strong oxidizers, peroxides, and alkalis Appearance and Odor: Appearance and odor vary depending upon the specific compound.	Health hazards are characterized normally through chronic exposure manifesting as histologic fibrosis of the lungs and ulceration of the nasal septum and skin. IARC, NTP and ACGIH list various chromium compounds as possessing carcinogenic properties.
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO ₃ or H ₂ O ₂ desorption; or Atomic absorption detection. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m ³ ACGIH: 0.15 mg/m ³ NIOSH: 0.10 mg/m ³ IDLH: 100 mg/m ³ as lead	The use of an air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m ³ . Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: 3164°F; 1740°C Melting Pt: 621°F; 327°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 11.34 Incompatibilities: Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids Appearance and Odor: Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

**TABLE 6-1
 CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
 TEAD, TOOELE, UTAH
 PAGE 8 OF 8**

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
METALS (continued)							
Zinc	7440-66-6	Particulate form - This substance is not detectable using a PID or FID.	Air sample using a particulate filter; acid desorption; AAS detection. Sampling and analytical protocol will proceed in accordance with NIOSH Method #7300.	OSHA: 10 mg/m ³ Total dust, 5 mg/m ³ Respirable fraction NIOSH: 5 mg/m ³ , 15 mg/m ³ (Ceiling) ACGIH: 10 mg/m ³	No identifiable warning properties to indicate presence and thereby detection. Recommended APR Cartridge: Suitable for dust and fume. Organic vapor acid gases with HEPA filter. Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: 1666°F; 908°C Melting Pt: 788°F; 419.8°C Solubility: Insoluble Flash Pt: Not available (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not available UEL/UFL: Not available Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 7.14 Incompatibilities: Strong acids, halogens, catalytic metals, combustibles, oxidizers, nitryl fluoride Appearance and odor: Bluish-white, lustrous metal, odorless	Inhalation of fumes may result in metal fume fever. This condition is characterized by metallic taste, dryness of the throat, coughing with generalized aching and flu-like symptoms. Effects through ingestion may include coughing, difficulty in breathing, and sweating. A human skin irritant. Irritation to the eyes may result from mechanical action.

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7.0 AIR MONITORING

7.1 INSTRUMENTS AND USE

Instruments will be used to monitor source points (monitoring well) and worker breathing zone areas, while observing instrument action levels. Action levels are discussed in Table 5-1 as they may apply to a specific task or location.

7.1.1 Photoionization Detector or Flame Ionization Detector

A photoionization detector (PID) with 10.6 eV (or equivalent) lamp source will be used as a precautionary measure to evaluate airborne concentrations of detectable contaminants. Previous site investigations did not indicate the presence of elevated concentrations of VOCs at any of the sites to be investigated as part of this scope of work. However, the use of this instrument will alert field crew members of conditions that are unlikely to be encountered. This instrument will be used to monitor potential source areas (bore holes, monitoring wells, acetate liners, etc.) and to screen the breathing zones of employees during site activities. The PID has been selected because it is capable of detecting a wide range of VOCs [NOTE: a flame ionization detector (FID) may be used as an alternative to the PID].

Prior to the commencement of any field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from any areas of potential contamination. These readings, any influencing conditions (i.e., weather, temperature, and humidity) and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

7.1.2 Action Levels

Observations of any sustained (greater than 1 minute in duration) readings above established background levels in worker breathing zones will indicate an unanticipated condition. Work shall be stopped and workers evacuated from the area if any sustained breathing zone readings are observed. Workers shall remain in an unaffected area until readings

subside to background levels. Site activities are unlikely to generate airborne dusts which may facilitate exposure via inhalation and ingestion. In the event that visible dusts are observed in the work area, workers will use dust suppression methods (area wetting) or will temporarily suspend site activities until measures can be implemented to prevent airborne dusts.

7.1.3 Hazard Monitoring Frequency

Table 5-1 presents the frequencies that hazard monitoring will be performed as well as the action levels which will initiate the use of elevated levels of protection. The SSO may decide to increase these frequencies based on instrument responses and site observations. The frequency at which monitoring is performed will only be reduced with prior consent of the PHSO or HSM.

7.2 FIELD CALIBRATION

Field calibration will be performed on the instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (copies of which can be found in the Health & Safety Guidance Manual which will be maintained on site for reference). Calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number

- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

Air monitoring using direct reading instrumentation will not be conducted in support of this activity. This decision is based on the following:

- The majority of the contaminants of concern are solids/particulates. Based on an evaluation of the tasks to be conducted significant dust generation is not anticipated.
- Information provided by the PM indicates source concentrations are low to moderate. Based on this source concentration exposure potential can be determine by visual evaluation. Dusts are visible when airborne concentration reaches approximately 2 mg/m³. This is well below the required airborne total dusts necessary to support exposure to the contaminants of concern identified in Table 6-1.
- Current instrumentation available will not provide contaminant identification only total dusts within the sample aliquot. As indicated above this can be accomplished through visual diction/determination.

Should conditions, contaminants of concern (type and concentrations) this approach may be changed.

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section specifies health and safety training and medical surveillance requirements for both Tetra Tech NUS and subcontractor personnel participating in on site activities.

8.1.1 Requirements For Tetra Tech NUS, Inc. and Subcontractor Personnel

Tetra Tech NUS and subcontractor personnel who will engage in field associated activities as described in this SSHP must have:

- Completed 40 hours of introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e).
- Completed 8-Hour Refresher Training, if the identified persons had introductory training more than 12 months prior to site work.
- Completed 8-hour Supervisory training in accordance with 29 CFR 1910.120(e)(4), if their assigned function will involve the supervision of subordinate personnel.

Documentation of introductory training or equivalent work experience, supervisory, and refresher training as well as site-specific training will be maintained at the site. Copies of certificates or other official documentation will be used to fulfill this requirement.

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to TtNUS personnel who will perform work on this project. Site-specific training will include:

- Names of designated personnel and alternates responsible for site safety and health (See Section 1.2).
- Safety, health, and other hazards present on site (See Sections 5.0 and 6.0 as well as Tables 5-1 and 6-1).
- Use of personal protective equipment.
- Work practices to minimize risks from hazards.
- Medical surveillance requirements (See Section 8.3).
- Signs and symptoms of overexposure to site contaminants (See Table 6-1).
- Contents of the Site-Specific Safety and Health Plan.
- Emergency action procedures (evacuation and assembly points) (See Sections 2.2 and 2.6).
- Spill response procedures.
- Review of the contents of relevant Material Safety Data Sheets.
- Use and applications of the Safe Work Permit.
- UXO Operating Procedure (See Appendix B).

Site-specific training documentation will be established through the use of Figure 8-1.

In addition, to the TtNUS Site-Specific Training, a brief meeting will be held daily to discuss operations planned for that day. At the end of the workday, a short meeting may be held to discuss the operations completed and any problems encountered. This activity will be supported through the use of a Safe Work Permit System (See Section 9.2).

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements for Tetra Tech NUS and Subcontractor Personnel

Tetra Tech NUS and subcontractor personnel participating in project field activities will have had a physical examination. Physical examinations shall meet the minimum requirements of paragraph (f) of OSHA 29 CFR 1910.120. The physical examinations will be performed to ensure that personnel are medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained at the job site and made available, as necessary. Subcontractor personnel may use an alternative documentation for this purpose. The "Subcontractor Medical Approval Form" can be used to satisfy this requirement, or a letter from an officer of the company. The letter should state that the persons listed in the letter participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR), Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response." The letter should further state the following:

- The persons listed have had physical examinations under this program within the frequency as determined sufficient by their occupational health care provider.
- Date of the exam.

- The persons identified have been cleared, by a licensed physician, to perform hazardous waste site work and to wear positive- and negative- pressure respiratory protection.

A sample Subcontractor Medical Approval Form and form letter have been provided to eligible subcontractors in the Bid Specification package. These documents will be made available upon request.

8.3.2 Requirements for Field Personnel

Each field team member, including subcontractors and visitors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet that is available in Attachment II of this HASP. This shall be provided to the SHSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTION

If through the execution of their contract elements the subcontractor will not enter the exclusion zone and there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from the training and medical surveillance requirements with the exception of Section 8.2. Examples of subcontractors who may qualify as exempt from training and medical surveillance requirements may include surveyors who perform surveying activities in site perimeter areas or areas where there is no potential for exposure to site contaminants and support or restoration services. **Use of this Subcontractor Exception is strictly limited to the authority of the Health and Safety Manager.**

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9.0 SITE OPERATIONS AND CONTROL

Site operations and control will be facilitated through the use of established work zones and security and control of those zones. These activities will minimize the impact and spread of contaminants as well as protect personnel and visitors within these zones during ongoing operations.

9.1 WORK ZONES

Tetra Tech NUS will delineate and use work zones to prevent the spread of contaminants to other areas of the site. A three-zone approach will be used for work at this site; an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. These will be used to control access to the work areas, restricting the general public, avoiding potentials to spread any contaminants, and to protect individuals who are not cleared to enter by way of training and/or medical surveillance qualifications.

9.1.1 Exclusion Zone

An Exclusion Zone will be established for each travel lane and each sampling point/location. The purpose of the exclusion zone is to define an area where a more rigorous protocol for workers protection is employed to protect personnel from chemical and physical hazards associated with the tasks to be conducted. Exclusion zone size and dimensions will vary based on activities. Based on the nature of the work to be conducted the exclusions zones and access travel lanes will be strictly adhered to due to UXO/MEC/DMM potential hazards.

Exclusion zones based on task associated hazards are as follows:

- Surface soil sampling. The exclusion zone for this activity will be set at the 10-feet surrounding the sampler.

Exclusion zones shall remain marked until the SHSO has evaluated the restoration effort and has authorized changing the zone status.

Exclusion zones will be marked using pin flags to direct and inform site personnel. It should be noted that Range Control activities (OB/OD) will not be conducted during Tetra Tech NUS, Inc. sampling effort.

9.1.2 Contamination Reduction Zone

The contamination reduction zone will be a control/supply point for supporting exclusion zone activities.

In order to move from the exclusion zone to a separate location the following activities will be used:

- As samplers move from location to location during sampling activities, sufficient supplies will be maintained so there is no need for decontamination. Samplers will drum the contaminated equipment which will be properly disposed of by TEAD as based on the sampling results. Samplers will complete personal decontamination using hygienic wipes to remove incidental contaminants. At the first available opportunity personnel will wash their face and hands. This is critical prior to breaks and lunch when contamination can be transferred to the mouth through hand to mouth contact.
- Disposable PPE such as nitrile surgeons gloves will be cleaned of gross contamination and placed with the sampling equipment.

9.1.3 Support Zone

The Support Zone will consist of a field trailer, storage, lay-down areas, or some other uncontaminated, controlled point. The Support Zone for this project will include a staging area where site vehicles can be parked, equipment will be unloaded, and where food and drink containers will be maintained. The support zones will be established in clean areas of the site.

9.2 SAFE WORK PERMITS

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit is included in Figure 9-1. The daily meetings conducted by the FOL/SHSO will further support these work permits. The use of these permits will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Safe Work Permits will require the signatures of either the FOL or the SHSO. Personnel engaged in on-site activities must be made aware of the elements indicating levels of protection and precautionary measures to be used.

The use of these permits will establish and provide for reviewing protective measures and hazards associated with each operation. This SSHP will be used as the primary reference for selecting levels of protection and control measures. The Safe Work Permit will take precedence over the SSHP when more conservative measures are required based on specific site conditions.

Upon completion of the work for which the Safe Work Permit was assigned, the Safe Work Permit will be turned into the FOL or the SHSO. Concerns, complaints, and suggestions may be made on the reverse of the Safe Work Permit for consideration by the FOL and/or the SHSO. Permits turned in with suggestions, difficulties, or complaints will be forwarded to the PHSO for review.

The Safe Work Permit and the SSHP will serve as the primary reference for work place evaluations and audits conducted to determine if the task is being conducted under the direction conveyed by the SSHP and the Safe Work Permit.

9.3 SITE MAP

Once the areas of contamination, access routes, topography, dispersion routes are determined, a site map will be generated and adjusted as site conditions change. This map will be posted to illustrate up-to-date information of contaminants and adjustment of zones and access points. This map will be posted at the field support trailer.

9.4 BUDDY SYSTEM

Personnel engaged in on-site activities will practice the "buddy system" to ensure the safety of the personnel involved in this operation.

9.5 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

Tetra Tech NUS and subcontractor personnel will provide MSDSs for chemicals brought on-site. The MSDSs will be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request. The SHSO will be responsible for implementing a site-specific Hazard Communication Program (See Section 5.0 of the TtNUS Health and Safety Guidance Manual). This includes collection and reviewing the MSDSs, creation and maintenance of an accurate Chemical Inventory Listing, addressing container labeling and personnel training issues, and other aspects of Hazard Communication.

Personnel are directed to review the applicable MSDS prior to use if they are unfamiliar with the potential hazards or recommended control measures of the materials they are using.

Based on information provided by the PM, it is currently not anticipated that chemicals substances (above a consumer commodity will not be brought on-site

**FIGURE 9-1
 SAFE WORK PERMIT**

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope (To be filled in by person performing work)

- I. Work limited to the following (description, area, equipment used): _____

 II. Names: _____

 III. On-site Inspection conducted Yes No Initials of Inspector _____

 TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- IV. Protective equipment required Respiratory equipment required
 Level D Level B Yes See Reverse
 Level C Level A No
 Modifications/Exceptions: _____

V. Chemicals of Concern	Action Level(s)	Response Measures
_____	_____	_____
_____	_____	_____

Note to FOL and/or SHSO: The selections listed in items VI through IX must be completed checking Yes, No, or NA as it may apply.

VI. Additional Safety Equipment/Procedures

- Hardhat Yes No Hearing Protection (Plugs/Muffs) ... Yes No
 Safety Glasses Yes No Safety belt/harness Yes No
 Chemical/splash goggles Yes No Radio Yes No
 Splash Shield Yes No Barricades Yes No
 Splash suit/coveralls (Type: _____) Yes No Gloves (Type) Yes No
 Steel toe/shank Workboots Yes No Work/rest regimen Yes No
 Chemical Protective Over-boots (Type: _____) Yes No
 Modifications/Exceptions: _____

VII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms	<input type="checkbox"/> <input type="checkbox"/>
Procedure for safe job completion	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes	<input type="checkbox"/> <input type="checkbox"/>
Contractor tools/equipment inspected.....	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points.....	<input type="checkbox"/> <input type="checkbox"/>

Preparation	VIII. Site		
	Yes	No	NA
Utility Locating and Excavation Clearance completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Equipment and Foot Traffic Routes Cleared and Established	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Barricaded and Isolated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- IX. Additional Permits required (Hot work, confined space entry, excavation, etc.). Yes No
 If yes, See SHSO for appropriate permit

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

9.6 COMMUNICATION

Communication with Range Control and emergency services will be accomplished using a two way radio provided by TEAD Range Control.

Redundant communication will also be established using cell phones. It will be the responsibility of the FOL and/or the SHSO to ensure sufficient signal is available within this area. If not the FOL and/or the SHSO will select a local provider.

It is anticipated that site personnel will be working in close proximity during proposed field activities. In the event that site personnel are in isolated areas or are separated by significant distances, a supported means of communication between field crews will be utilized.

9.7 SITE VISITORS

Potential site visitors that may be encountered during the performance of the field work could include the following:

- Personnel invited to observe or participate in operations by Tetra Tech NUS.
- Regulatory personnel (i.e., DOD, USACE, EPA, OSHA, etc.)
- TEAD Personnel
- Other authorized visitors

Non-DOD personnel working on this project are required to gain initial access to the facility by coordinating with the TtNUS PM or designee and following established base access procedures.

Once access to the base is obtained, personnel who require access to Tetra Tech NUS work sites (areas of ongoing operations) will be required to obtain permission from the FOL and the Base Contact. Upon gaining access to the work site, site visitors wishing to observe operations in progress will be required to meet the minimum requirements as stipulated below.

- Site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individuals name (proper identification required), who they represent, and the purpose for the visit. The FOL is responsible for ensuring that site visitors are always escorted while on site.
- Site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER training), and medical surveillance as stipulated in Section 8.3, of this document. In addition, to enter the sites operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

Once the site visitors have completed the above items they will be permitted to enter the site and applicable operational areas. Visitors are required to observe the protective equipment and site restrictions in effect at the work areas visited. Any visitors not meeting the requirements as stipulated in this plan for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized entry will cause on-site activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from Range Control and the Base Contact, if necessary. At a minimum, the Base Contact will be notified of any unauthorized visitors.

9.8 SITE SECURITY

As this activity will take place at an US Army Depot, the first line of security will be provided by the facility gate restricting the general public. The second line of security will take place at Range Control who control access to the work area.

Security at the work areas will be accomplished using field personnel. Tetra Tech NUS personnel will retain complete control over active operational zones.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that bulk hazardous will be accumulated as part of this field effort. Based on the scope of work the only anticipated waste stream will be sampling tools and gloves. It is also anticipated that the volume potentially generated through this activity will be less than 55-gallons. Therefore, a site-specific Spill Containment Plan will not be required in support of this scope of work.

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11.0 CONFINED-SPACE ENTRY

It is not anticipated under the proposed scope of work that confined-space and/or permit-required confined-space activities will be conducted. Therefore, **personnel under the provisions of this SSHP are not allowed, under any circumstances, to enter any confined spaces.**

A confined space is defined as a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, and vaults are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

A Permit Required Confined Space is defined as a confined space with one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined spaces or permit-required confined spaces, consult the TtNUS Health and Safety Guidance Manual or call the PHSO and/or the HSM.

12.0 MATERIALS AND DOCUMENTS

The FOL (or designee) will ensure that the following materials/documents are at the project site and are used as required.

- A signed copy of the SSHP
- The TtNUS Health and Safety Guidance Manual
- UXO Operating Procedure (see Appendix B)
- Incident Reports (including ENG Form 3394)
- Medical Data Sheets
- OSHA Job Safety and Health Poster (posted at the site)
- Training/Medical Surveillance Documentation Form (Fig. 8-1)
- OSHA 29 CFR 1910.120 (HAZWOPER) Training certificates
- Emergency Notification Procedures (Table 2-1, extra copy for posting)
- A copy of current training documentation and copies of physician's clearance for each site worker
- Safe Work Permits

12.1 MATERIALS TO BE POSTED AT THE SITE

The following documentation is to be posted at the site for quick-reference purposes. In situations where posting of these documents is not feasible (such as no office trailer), these documents will be maintained by the FOL in an accessible location.

Chemical Inventory Listing - This list represents the chemicals brought onsite, including sample preservatives, fuel, etc. This list should be posted in a central area.

Material Safety Data Sheets - The MSDS should also be in a central area accessible to site personnel. These documents should match the listings on the chemical inventory list for the substances used onsite. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster - This poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted where notices to employees are normally placed. The FOL will ensure that this poster is not defaced, altered, or covered by other material.

Site Clearance Posting - This list is found within the training section of the SSHP and identifies site personnel, dates of training (including site-specific training), and medical surveillance. This list indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in site activities.

Emergency Phone Numbers and Directions to the Hospital(s) - This list of numbers and the hospital directions will be maintained at the phone communications points and in each site vehicle.

Medical Data Sheets/Cards - Medical Data Sheets will be filled out by onsite personnel and filed in a central location. The Medical Data Sheet will accompany an individual with any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to site personnel to be carried on their person.

Hearing Conservation Standard (29 CFR 1910.95) - This standard will be posted anytime hearing protection or other noise abatement procedures are employed.

Personnel/Area Monitoring - All results generated through personnel/area sampling (levels of airborne toxins, noise levels, etc.) will be posted within the lunch/break rooms.

Placards and Labels - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using U.S. DOT placards and acceptable labels [Hazard Communication 29 CFR 1910.1200 (f)].

The purpose of posting these materials is to allow site personnel quick access to this information. Variations concerning location and methods of presentation are acceptable, provided the objective is accomplished.

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APPENDIX A
REFERENCES

REFERENCES

ATSDR (Agency for Toxic Substances and Disease Registry), 2003. Public Health Assessment Tooele Army Depot (North Area) Tooele, Tooele County, Utah Prepared By: Federal Facilities Assessment Branch Division Of Health Assessment And Consultation, August 29, 2003.

Department of Defense (DoD), 2008. Guide for Implementing EPA SW-846 Method 8330B Prepared By: DoD Environmental Data Quality Workgroup, June 2008.

ERTEC, 1982. Assessment of Environmental Contamination Exploratory Stage, Tooele Army Depot, Tooele, Utah, October.

OSHA. 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER).

TEAD (Tooele Army Depot), 1998. Hazardous waste storage, incineration, and open burning/open detonation permit. Volumes I and II. June 30.

Tetra Tech NUS, Inc. Health and Safety Guidance Manual.

Thiboutot, S.G. Ampleman and A.D. Hewitt, 2004. Nitroaromatics, Nitroamines and Nitrate Esters by High Performance Liquid Chromotography and the Guide for Characterization of Sites Contaminated with Energetic Materials, ERDC/CRREL TR-02-1, U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH. 2002.

U.S. Army Corps of Engineers, November 2003. EM 385-1-1, Safety and Health Requirements Manual.

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APPENDIX B

U.S. ARMY AND USACE
ORDNANCE AVOIDANCE PROCEDURES

CEHNC-OE-CX (200-1c)

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Basic Safety Concepts and Considerations for Ordnance and Explosives (OE) Operations, OE Center of Expertise (CX) Interim Guidance Document 00-03

1. PURPOSE: To specify how OE operations will be performed on project sites.

2. APPLICABILITY: This guidance is applicable to all U.S. Army Corps of Engineers Commands having responsibility for performing OE response activities.

3. REFERENCES: Refer to Appendix A of the enclosure.

4. REQUIREMENTS AND PROCEDURES: Refer to the enclosed document, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations. This document should be used by USACE personnel at OE sites and should be incorporated into contract work statements for OE activities. This document supersedes Interim Guidance Document 00-02, Basic Safety Concepts and Considerations for Ordnance and Explosives (OE) Operations, dated 7 March 2000. We are issuing a revised document to make both minor and significant changes to the 7 March 2000 version. Significant changes include:

a. Paragraphs 1-7.f.(4) and 6-1.b: Clarification is provided for the use of earth-moving machinery to remove overburden from suspected OE.

b. Paragraph 1-8.b: Clarification is provided concerning the supervision of activities performed by non-UXO personnel.

c. Paragraph 2-1.c: Additional detail is provided for procedures to be followed when suspect chemical warfare materiel (CWM) is encountered at a conventional OE site.

d. Paragraph 6-1.a: The term "UXO personnel" is replaced by "UXO qualified personnel" in reference to hand excavation of suspect OE.

e. Paragraph 7-1: The sentence previously reading "Open burning of explosives, propellants, incendiary materials, and pyrotechnics is unauthorized" is deleted.

CEHNC-OE-CX (200-1c)

SUBJECT: Basic Safety Concepts and Considerations for Ordnance
and Explosives (OE) Operations, OE Center of Expertise (CX)
Interim Guidance Document 00-03

5. EFFECTIVE DATES: The requirements and procedures set forth
in this interim guidance are effective immediately. They will
remain in effect indefinitely, unless superseded by other policy
or regulation.

6. POINTS OF CONTACT: If you need additional information, please
contact Mr. Gregory Bayuga at 256-895-1596.

FOR THE COMMANDER:

Encl

C. DAVID DOUTHAT, P.E.
Director, Ordnance and
Explosives Team

DISTRIBUTION:

Commander,

U.S. Army Corps of Engineers, ATTN: CEMP-RT (Mr. Larry Barb)/
CESO-E (Mr. Harris Yeager), 20 Massachusetts Avenue, NW.,
Washington, DC 20314-1000

U.S. Army Engineer Division, Mississippi Valley,
ATTN: CEMVD-ET-CR (Ms. Susan Hampton), P.O. Box 80, Vicksburg,
MS 39181-0080

U.S. Army Engineer District, New Orleans, ATTN: CEMVN-ED-PM,
P.O. Box 60267, New Orleans, LA 70160-0267

U.S. Army Engineer District, St. Louis, ATTN: CEMVS-PM-M/ED-P,
1222 Spruce Street, St. Louis, MO 63103-2833

U.S. Army Engineer District, Vicksburg, ATTN: CEMVK-ED-DR,
2101 N. Frontage Road, Vicksburg, MS 39180-5191

U.S. Army Engineer Division, Northwestern, ATTN: CENWD-ED-CP,
12565 West Center Road, Omaha, NE 68144-3869

U.S. Army Engineer District, Kansas City, ATTN: CENWK-EP-EH
(Mr. Millard Stone), 700 Federal Bldg., Kansas City, MO
64106-2896

U.S. Army Engineer District, Omaha, ATTN: CENWO-ED-EH
(Ms. Tami Dittmar), 215 N. 17th Street, Omaha, NE 68102-4978

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U.S. Army Engineer District, New England, ATTN: CENAE-CO-TD
(Mr. Bruce Williams), 696 Virginia Road, Concord, MA
01742-2751

U.S. Army Engineer Division, North Atlantic, ATTN: CENAD-PP-PM,
90 Church Street, New York, NY 10007-2979

CEHNC-OE-CX (200-1c)

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U.S. Army Engineer District, Baltimore, ATTN: CENAB-EN-H
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Street, Norfolk, VA 23510-1096

U.S. Army Engineer Division, Great Lakes & Ohio River,
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Chicago, IL 60606-7206

U.S. Army Engineer District, Chicago, ATTN: CELRC-ED-P,
111 N. Canal Street, Suite 600, Chicago, IL 60606-7206

U.S. Army Engineer District, Detroit, ATTN: CELRE-ED-D,
P.O. Box 1027, Detroit, MI 48231-1027

U.S. Army Engineer District, Rock Island, ATTN: CEMVR-ED-D/
ED-DO, P.O. Box 2004, Rock Island, IL 61204-2004

U.S. Army Engineer District, St. Paul, ATTN: CEMVP-ED-M,
190 5th Street East, St. Paul, MN 55101-1637

U.S. Army Engineer District, Alaska, ATTN: CEPOA-EN-EE-TE
(Mr. Bernie Gagnon), P.O. Box 898, Anchorage, AK 99506-0898

U.S. Army Engineer District, Portland, ATTN: CENWP-PE-DC,
P.O. Box 2946, Portland, OR 97208-2946

U.S. Army Engineer District, Seattle, ATTN: CENWS-EN-GT
(Ms. Elizabeth Dietrich), P.O. Box 3755, Seattle, WA
98124-2255

U.S. Army Engineer District, Walla Walla, ATTN: CENWW-PM,
Bldg 602, City-County Airport, Walla Walla, WA 99362-9265

U.S. Army Engineer District, Huntington, ATTN: CELRH-DL-M
(Mr. Richard Meadows), 502 8th Street, Huntington, WV
25701-2070

U.S. Army Engineer District, Louisville, ATTN: CELRL-ED-G
(Mr. Bruce Murray), P.O. Box 59, Louisville, KY 40201-0059

U.S. Army Engineer District, Nashville, ATTN: CELRN-ER-H
(Mr. Mike Zoccola), P.O. Box 1070, Nashville, TN 37202-1070

U.S. Army Engineer Division, Pacific Ocean, ATTN: CEPOD-ET-E
(Mr. Allen Chin), Bldg 230, Fort Shafter, HI 96858-5440

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U.S. Army Engineer Division, South Atlantic, ATTN: CESAD-PD-R,
77 Forsyth Street SW, Room 313, Atlanta, GA 30335-6801

U.S. Army Engineer District, Charleston, ATTN: CESAC-EN-PR,
P.O. Box 919, Charleston, SC 29402-0919

U.S. Army Engineer District, Jacksonville, ATTN: CESAJ-PD-EE,
P.O. Box 4970, Jacksonville, FL 32232-0019

U.S. Army Engineer District, Mobile, ATTN: CESAM-EN-GH
(Mr. Michael Thompson), P.O. Box 2288, Mobile, AL 36628-0001

CEHNC-OE-CX (200-1c)

SUBJECT: Basic Safety Concepts and Considerations for Ordnance
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U.S. Army Engineer District, Savannah, ATTN: CESAS-EN-GH
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U.S. Army Engineer District, Wilmington, ATTN: CESAW-TS-PE,
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U.S. Army Engineer District, Los Angeles, ATTN: CESPL-ED-D,
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U.S. Army Engineer District, Los Angeles, ATTN: CESPL-CO-SS,
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U.S. Army Engineer District, Sacramento, ATTN: CESPCK-PPMD
(Ms. Linda Finley-Miller), 1325 J. Street, Sacramento, CA
95814-2922
U.S. Army Engineer District, Sacramento, ATTN: CESPCK-CO-CA
(Mr. Clinton Huckins), Monterey Project Office, Presidio
of Monterey, CA 93944-5000
U.S. Army Engineer District, San Francisco, ATTN: CESPKN,
333 Market Street, San Francisco, CA 94105-2195
U.S. Army Engineer Division, Southwestern, ATTN: CESWD-PP-M,
1114 Commerce Street, Room 404, Dallas, TX 75242-0216
U.S. Army Engineer District, Albuquerque, ATTN: CESPAP-ED-GH,
4101 Jefferson Plaza, NE., Albuquerque, NM 87109
U.S. Army Engineer District, Fort Worth, ATTN: CESWF-PM-J
(Mr. Dave Scotto), P.O. Box 17300, Ft. Worth, TX 76102-0300
U.S. Army Engineer District, Galveston, ATTN: CESWG-ED-DC,
P.O. Box 1229, Galveston, TX 77553-1229
U.S. Army Engineer District, Little Rock, ATTN: CESWL-ED-GH,
P.O. Box 867, Little Rock, AR 72203-0867
U.S. Army Engineer District, Tulsa, ATTN: CESWT-EC-DR
(Ms. Susan Trussell), P.O. Box 61, Tulsa, OK 74121-0061

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U.S. Army Engineer District, Omaha, HTRW Center of Expertise,
ATTN: CEMRO-HX-T (Ms. Sandi Zebrowski), 12565 West Center
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Chief of Staff, Department of the Army Safety Office,
ATTN: DACS-SF (Mr. Jim Patton), 200 Army Pentagon, Room 3D253,
Washington, DC 20310-0200
Chairman, Department of Defense Explosives Safety Board,
ATTN: DDESB-KT, 2461 Eisenhower Avenue, Alexandria, VA
22331-0600
Director, U.S. Army Defense Ammunition Center, ATTN: SIOAC-ESL,
Route 84 N. Bldg. 249, 3700 Army Depot Road, Savanna, IL

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***BASIC SAFETY CONCEPTS AND
CONSIDERATIONS FOR
ORDNANCE AND EXPLOSIVES
OPERATIONS***

**U.S. ARMY ENGINEERING AND SUPPORT
CENTER, HUNTSVILLE**

22 May 2000

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BASIC SAFETY CONCEPTS AND CONSIDERATIONS FOR ORDNANCE AND EXPLOSIVES (OE) OPERATIONS

CHAPTER 1 INTRODUCTION

1-1. Purpose. This pamphlet establishes the safe operating procedures for dealing with ordnance and explosives (OE) and unexploded ordnance (UXO) items on formerly used defense sites (FUDS), base realignment and closure (BRAC) and installation restoration (IR) projects. Because there are no absolute safe procedures for dealing with OE, merely procedures considered being least dangerous, it is essential that a planned and systematic approach be established.

1-2. Applicability. This pamphlet applies to all Headquarters, United States Army Corps of Engineers (HQUSACE) elements, United States Army Corps of Engineers (USACE) commands, and their contractors having the responsibility for performing OE response activities. For the purpose of this document, all references to OE include UXO.

1-3. References. Required and related publications are listed in appendix A.

1-4. Distribution. Approved for public release; distribution is unlimited.

1-5. Policy. It is the policy of the USACE to produce products and services that fully meet the customers' expectations of quality, timeliness and cost effectiveness. All OE response procedures must be formulated to ensure harmony with the USACE Strategic Vision and should be in concert with activities presented in other USACE guidance. There should be no compromise of health and safety requirements to meet production or quality goals. Safety is the leading edge of quality.

1-6. Responsibilities. It is the responsibility of all USACE and contractor personnel involved with OE response projects to safely execute them in accordance with (IAW) the approved Site Safety and Health Plan (SSHP), Work Plan (WP), and all applicable laws, regulations, and policies.

1-7. Terms and Definitions.

a. Ordnance and Explosives. Ammunition, ammunition components, chemical or biological warfare materiel, or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried or fired. Such ammunition components and explosives are no longer under accountable record control of any DOD organization or activity.

b. Explosive Soil. Explosive soil refers to a mixture of explosives in soil, sand, clay or other solid media at concentrations such that the mixture itself is explosive.

c. Unexploded Ordnance (UXO). Military Munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to the operations, installations, personnel, or material, and remain unexploded either by malfunction, design, or any other cause.

d. UXO Qualified Personnel. The term UXO Qualified Personnel applies only to personnel meeting the requirements for the positions of UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, and the Senior UXO Supervisor. For qualification requirements, refer to EP 1110-1-18, Ordnance and Explosives Response.

e. OE Procedures. These procedures include, but are not limited to, the following actions performed by a UXO qualified individual.

(1) Gaining access to (manual excavation) and identifying subsurface anomalies and assessing the condition of buried OE.

(2) Identifying and assessing the condition of surface OE.

(3) Recovery and final disposal of all OE.

f. OE Related procedures: These OE related procedures include, but are not limited to, the following and can be performed by a non-UXO qualified individual:

(1) Location and marking of subsurface anomalies.

(2) Location and marking of suspected surface OE.

(3) Transportation and storage of recovered OE.

(4) Utilizing earth-moving machinery (EMM) to excavate overburden from suspected OE.

1-8. General Safety Concerns and Procedures.

a. OE operations will not be conducted until a complete plan for the site is prepared and approved. These plans will be based upon limiting exposure to the minimum number of personnel, for the minimum time, to the least amount of OE consistent with safe and efficient operations.

b. Only UXO qualified personnel will perform OE procedures. Non-UXO personnel may be utilized to perform OE related procedures when supervised by a UXO Technician III. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III.

c. Personnel who will be handling OE items will not wear outer or inner garments having static electricity generating characteristics. Materials made of 100 percent polyester, nylon, silk and wool, are highly static producing. Refer to DA Pam 385-64 for more information regarding non-static producing clothing.

d. Prior to any action being performed on an ordnance item, all fuzing will be positively identified. This identification will consist of fuze type by function, condition (armed or unarmed), and the physical state/condition of the fuze, i.e., burned, broken, parts exposed/sheared, etc.

CHAPTER 2 OE SAFETY PRECAUTIONS

2-1. OE Safety Precautions.

a. Every effort will be made to identify a suspect OE item. Under no circumstances will any OE be moved in an attempt to make a positive identification. The OE item will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown OE item is encountered, the on-site USACE representative will be notified immediately. If there is no USACE personnel on-site, the District or Design Center's OE Safety representative will be notified as soon as possible. If external research is required, it will be initiated by the U.S. Army Engineering and Support Center, Huntsville. The following are additional considerations for the safe handling of OE items:

- (1) Projectiles containing Base Detonating (BD) fuzes are to be considered armed if the round is fired.
- (2) Arming wires and pop-out pins on unarmed fuzes should be secured prior to any movement.
- (3) Do not depress plungers, turn vanes, rotate spindles, levers, setting rings or other external fittings on OE items. Such actions may arm or activate the OE.
- (4) Do not attempt to remove any fuze(s) from the OE. Do not dismantle or strip components from any OE items.
- (5) UXO Personnel are not authorized to inert any OE items found on-site.
- (6) OE /UXO items will not be taken from the site as souvenirs/training aids.
- (7) Civil War ordnance will be treated as any other OE.

b. Prior to entering areas/ranges contaminated with Improved Conventional Munitions (ICM) an approved DA -waiver must be obtained. The District and/or Design Center's OE Safety representative must be notified.

c. Any time -suspect chemical warfare materiel (CWM) is encountered during conventional OE site activities, all work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery. A team consisting of a minimum of two personnel will secure the area to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area.

(1) On Formerly Used Defense Sites (FUDS), the UXO team will notify the local Point of Contact (POC) designated in the Work Plan. The local POC will facilitate Explosives Ordnance Disposal (EOD) response and two personnel will secure the site until EOD's arrival. If the local POC designated in the Work Plan is not the local law enforcement agency, the local POC will inform the local law enforcement agency of the discovery. The EOD unit will notify the Technical Escort Unit (TEU) and secure the area until TEU's arrival. After notifying the local law enforcement agencies, the local POC will notify the USAESCH Safety Office to inform them of the actions taken.

(2) On active installations, the UXO team will normally notify the Range Control Officer, Facility Engineer, Post Headquarters, or POC designated in the Work Plan.

d. Avoid inhalation and skin contact with smoke, fumes, and vapors of explosives and other related hazardous materials.

e. Consider OE items, which may have been exposed to fire and detonation, as extremely hazardous. Chemical and physical changes may have occurred to the contents, which might render it more sensitive than its original state.

f. Do not rely on the color coding of OE for positive identification. Munitions having incomplete or improper color codes have been encountered.

g. Avoid approaching the forward area of an OE item until it can be determined whether or not the item contains a shaped charge. The explosive jet, which is formed during detonation, can be lethal at great distances. Assume that all shaped charge munitions contain a piezoelectric (PZ) fuzing system until identified. PZ fuzing is extremely sensitive. They can function at the slightest physical change and can remain hazardous for an indefinite period of time.

h. Approach an unfired rocket motor from the side at a 45-degree angle. Accidental ignition can cause a missile hazard and hot exhaust.

i. Do not expose unfired rocket motors to any Electromagnetic Radiation (EMR) sources.

j. Consider an emplaced landmine armed until proven otherwise. It may be intentionally booby-trapped to deceive.

(1) Many training mines contain spotting charges capable of inflicting serious injury.

(2) Exercise extreme care with wooden mines that have been buried for long periods of time. Certain soil conditions can cause the wood to deteriorate and any inadvertent movement or pressure may initiate the fuze.

k. Assume that practice OE contains a live charge until it can be determined otherwise. Expanded pyrotechnic and practice devices can contain red or white phosphorus residue. Due to incomplete combustion, the phosphorous residue may re-ignite spontaneously if the crust is broken and exposed to air.

l. Do not approach a smoking white phosphorous (WP) munition. Burning WP may detonate the explosive burster charge at anytime.

m. Foreign ordnance was returned to the United States for exploitation and subsequent disposal. Every effort will be made to research the applicable documentation and publications prior to commencement of a project.

n. Anomaly Avoidance Operations. Anomaly Avoidance procedures are detailed in

- ETL 385-1-2, (Draft) Generic Scope of Work for Ordnance Avoidance Operations, August 1996, and
- Ordnance and Explosives (OE) Center of Expertise (CX) Interim Guidance Document 99-01, Unexploded Ordnance (UXO) Support for Other Activities, 5 February 1999.

These documents can be located on the OE Home Page at:

<http://www.hnd.usace.army.mil/oew/policy/regpro.html>.

CHAPTER 3 OE STORAGE

3-1. OE Storage. During OE projects, explosive storage falls into two categories, on-DOD installations and off-DOD installations.

a. On-DOD installations the provisions of DOD 6055.9 STD will be followed. Generally, the installation should have an explosive storage area that meets DOD standards. The permitting and compliance requirements are the responsibility of the installation. The compatibility of explosives found in Chapter 3, DOD 6055.9 STD will be followed. OE items awaiting final disposition will not be stored with other explosives. Storage of commercial explosives requires DOD hazard class storage compatibility group.

b. In the event the installation does not have an existing storage facility, the provisions of paragraph c, in this section, will apply.

c. Off-DOD installations, the contractor will be responsible for the construction of a temporary explosive storage area. This temporary storage area will meet all local, state, and 27 CFR, Bureau of Alcohol Tobacco and Firearms (BATF) requirements and as much of DOD 6055.9 STD as is practical to implement. The establishment of a temporary explosive storage area must meet the following requirements.

(1) The area will, if possible, meet the inhabited building and public traffic route distances specified in DOD 6055.9 STD. If the distances are less than required by the DOD guidance, a proposed barricading plan to protect the public from accidental detonation must be submitted and approved by the Huntsville Center's Engineering Directorate.

(2) Magazines must meet the requirements of the BATF regulations, and each magazine must have a Net Explosive Weight (NEW) established for the explosives to be stored.

(3) Each magazine must be grounded as specified in NFPA 780 and must meet the intermagazine distances as defined in the DOD guidance.

(4) A physical security survey will be conducted to determine if fencing or guards are required. This survey will be coordinated through local law enforcement agencies. Generally, a fence around the magazine is not needed IAW BATF regulations. However, it is the responsibility of the contractor for determining the degree of protection to prevent the theft of explosives and OE items.

(5) A fire plan for either on or off-installation explosive storage areas will be prepared and coordinated with the local fire department. All magazines will have placards IAW 27 CFR/ATF P 5400.7 or DOD 6055.9 STD.

CHAPTER 4 OE TRANSPORTATION

4-1. OE Transportation. In the event that OE items must be transported off-site, the provisions of 49 CFR, DA Pam 385-64 state and local laws will be followed. These additional considerations are provided for the safe transportation of OE items:

a. USACE contractors are prohibited from transporting OE off-site for destruction until the provisions of paragraph 1-9, TB 700-2 are followed.

b. Do not transport WP munitions unless they are immersed in water, mud or wet sand.

c. If loose pyrotechnic, tracer, flare or similar mixtures are to be transported, they will be placed in #10 mineral oil or equivalent to minimize the fire and explosion hazards.

d. Incendiary loaded munitions should be placed on a bed of sand and covered with sand to help control the burn if a fire should start.

e. If an unfired rocket motor must be transported, it will be positioned in the vehicle parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

f. If a base-ejection projectile must be transported to a disposal area, the base will be oriented in the vehicle so that it is parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

g. OE with exposed hazardous fillers such as High Explosive (HE), will be placed in appropriate containers with packing material to prevent migration of the hazardous fillers. Padding should be added to protect the exposed filler from heat, shock and friction.

CHAPTER 5 EXCLUSION ZONE OPERATIONS

5-1. Exclusion Zone Operations. On OE project sites, it is the responsibility of the contractor's UXO Safety Officer (UXOSO) to establish the exclusion zone for each UXO team. This exclusion zone should not be confused with the safe separation distance, which is maintained between teams.

a. The purpose of the exclusion zone is for the protection of non-essential project personnel and the public from blast overpressure and fragmentation hazards. There are two criteria for calculating exclusion zones;

(1) Intentional Detonations. When destroying ordnance, both the hazards from fragmentation and overpressure must be considered. The minimum separation distances in DOD 6055.9 STD will be used unless otherwise stated. The maximum fragmentation and overpressure distances may also be calculated IAW HNC-ED-CS-S-98-1, Methods for Predicting Primary Fragmentation Characteristics of Cased Munitions.

(2) Unintentional Detonations. If the identification of OE on an OE site is unknown, the minimum separation distance specified in DOD 6055.9 STD, Chapter 5, Paragraph C5.5.4, will be used to establish the exclusion zones. When the identification of OE items are known, the exclusion zones will be determined by the U.S. Army Engineering and Support Center, Huntsville, (USAESCH) Engineering Directorate using HNC-ED-CS-S-98-1.

b. When multiple teams are working on site, a safe separation distance will be established. The minimum distance maintained between teams will never be less than 200 feet or the K50 overpressure distance. The one that is greater will be used.

c. While OE operations are being conducted, only personnel essential for the operation will be allowed in the exclusion zone. When non-essential personnel enter the exclusion zone, all OE operations will cease. In addition to this work stoppage, the following actions will be accomplished:

(1) The individual(s) must receive a safety briefing and sign the visitor's log prior to entering the zone.

(2) The individual(s) will be escorted by a UXO qualified individual.

(3) All OE operations will cease within the radius of the exclusion zone for the areas to be visited.

d. All personnel working within the exclusion zone will comply with the following:

(1) There will be no smoking within the exclusion zone, except in areas designated by the UXOSO.

(2) There will be no open fires for heating or cooking (gas stoves, grills, etc.) within the exclusion zone, except where authorized by the UXOSO.

(3) During magnetometer operations, workers will have no metal parts in or on their shoes that would cause the magnetometer to present false indications.

CHAPTER 6 OE EXCAVATION OPERATIONS

6-1. OE Excavation Operations.

a. Hand excavation is the most reliable method for uncovering OE provided the item is near the surface. Hand excavation exposes personnel to the hazard of detonation for longer periods of time than any other method. Taking this into consideration, only UXO qualified personnel will be used to accomplish this task.

b. Earth-Moving Machinery (EMM) may be used to excavate overburden from suspected OE. EMM will not be used to excavate within 12 inches of a suspected OE. Once the EMM is within 12 inches of the OE, the excavation will be completed by hand excavation methods. Personnel who are not UXO qualified may operate EMM only when supervised by a UXO Technician III.

(1) If more than one EMM is to be used on site, the same minimum separation distances required for multiple work teams applies.

(2) EMM operations will be conducted within the guidelines of EM 385-1-1 and 29 CFR 1926 Subpart P.

c. Excavation operations, whether by hand or EMM, will employ a step down or offset access method. Under no circumstances will any excavation be made directly over the suspected OE.

CHAPTER 7 OE DISPOSAL OPERATIONS

7-1. OE Disposal Operations. All demolition operations will be conducted IAW TM 60A 1-1-31 and the USAESCH Procedures for Demolition of Multiple Rounds on OE Sites. No other publications are to be used for these operations.

a. As a general rule, all demolition operations will be accomplished by electrical means to assure maximum safety. There are exceptions to this requirement in situations where static electricity or Electromagnetic Radiation (EMR) hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). The following precautions from TM 9-1375-213-12 are to be followed.

(1) Premature detonation of electric blasting caps by induced current from radio frequency (RF) signals is possible. Refer to TM 9-1375-213-12 that shows the minimum safe distance in respect to transmitter power and indicates distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

(2) Lightning is a hazard to both electric and non-electric blasting caps. A strike or a nearby miss is almost certain to initiate either type of cap or other sensitive explosive elements such as caps in delay detonators. Lightning strikes, even at distant locations, may cause extremely high local earth currents that may initiate electrical firing circuits. Effects of remote lightning strikes are multiplied by proximity to conducting elements, such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduits. The only safe procedure is to suspend all blasting activities during electrical storms and when one is impending.

(3) Electric power lines also pose a hazard for electric initiating systems. It is recommended that any demolition operation closer than 155 meters to electric power lines be done with a non-electric system such as NON-EL. This non-electric firing system provides the same amount of safety and control as electrical firing systems, but without the interference of EMR and static electricity hazards.

(4) Provisions of paragraph 1-9, TB 700-2 will be fully complied with prior to USACE contractors transporting OE off-site for destruction.

a. Only serviceable condition explosive material will be used for disposal operations.

b. The only acceptable disposal method is the one stated in the appropriate TM60 Series manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.

NOTE

Oil well perforators/conventional shape charges are not acceptable substitutes for bulk explosives and will not be used for disposal operations except where applicable, refer to TM 60A-2-1-51. Otherwise these items are to be used only for the venting OE items prior to their turn-in as scrap.

c. If a situation dictates, protective measures to reduce shock, blast overpressure, and fragmentation will be taken. The USAESCH Engineering Directorate will assist in any design work and will review and approve all proposed protective works. As a minimum requirement all demolition shots will be tamped with clean earth or sand. IAW DOD 6055.9 STD the following separation distances will be observed unless otherwise directed by the Engineering Directorate.

(1) Minimum separation distance for non-fragmenting explosive materials will be no less than 1250 feet.

(2) Minimum separation distance for fragmenting explosive ordnance will be no less than 2500 feet. For bombs and projectiles with a diameter of 5 inches or greater, use a minimum distance of 4000 feet.

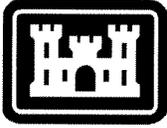
(3) Ordnance items with lifting lugs, strong backs, base plates, etc., will be oriented away from personnel, as fragments from these items tends to travel farther than normal.

d. Once demolition operations are completed, a thorough search of the demolition area will be conducted with a magnetometer to ensure a complete disposal was accomplished.

g. Inert ordnance will not be disposed of for scrap until the internal fillers/voids have been exposed and unconfined. Heat generated during the reclamation process can cause the inert fillers, moisture or air to expand and burst the sealed casings. In this situation, Oil Well Perforators can be used for venting these ordnance items which require demilitarization.

Appendix A

27 CFR 55	Alcohol, Tobacco Products and Firearms
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
49 CFR 100-199	Hazardous Materials Transportation
DOD 6055.9 STD	DOD Ammunition and Explosives Safety Standards, August 1997
AR 190- 11	Physical Security
DA PAM 385-64	Ammunition and Explosives Safety Standards
TM 9-1375-213-12	Operators and Organizational Maintenance Manual; Demolition Materials
TM 60A 1-1-22	EOD Procedures /General EOD Safety Procedures, April 1991
TM 60A 1-1-31	EOD Procedures/General Information on EOD Disposal Procedures, May 1994
EM 385-1-1	USACE Safety and Health Requirements Manual, September 1996
USAESCH	Procedures for Demolition of Multiple Rounds (consolidated shots) on Ordnance and Explosive Sites, August 1998
ER 1110-1-8153	Ordnance and Explosives Response, 19 May 1999
EP 1110-1-18	Ordnance and Explosives Response, 24 April 2000
ATF P 5400.7	ATF Explosives Laws and Regulations, June 1990
HNC-ED-CS-S 98-1	Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives, January 1998
HNC-ED-CS-S 98-2	Methods for Calculating Range to No More Than One Hazardous Fragment Per 600 Square Feet on OE Sites, January 1998
HNC-ED-CS-S 96-8	Guide Selection and Siting of Barricades for Selected OE, September 1997



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SAFETY

BASIC SAFETY CONCEPTS AND CONSIDERATIONS FOR MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) RESPONSE ACTION OPERATIONS

ENGINEER PAMPHLET

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AVAILABILITY

Electronic copies of this and other U.S. Army Corps of Engineers publications are available on the Internet at <http://www.hnd.usace.army.mil/techinfo/engpubs.htm>. This site is the only repository for all official USACE engineer regulations, circulars, manuals, and other documents originating from HQUSACE. Publications are provided in portable document format (pdf).

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Safety

BASIC SAFETY CONCEPTS AND CONSIDERATIONS FOR MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) RESPONSE ACTION OPERATIONS

1. Purpose. This pamphlet establishes U.S. Army Corps of Engineers (USACE) operating procedures for dealing with military munitions at Formerly Used Defense Sites (FUDS), Base Realignment and Closure (BRAC), and Installation Restoration projects. There are no absolutely safe procedures for dealing with military munitions, merely procedures considered to be the least dangerous; therefore, it is essential that a planned and systematic approach to dealing with such items be established.
2. Applicability. This pamphlet applies to all Headquarters, USACE elements and all USACE commands having responsibility for performing munitions response to munitions and explosives of concern (MEC) response action operations.
3. Distribution Statement. Approved for public release; distribution is unlimited.
4. References. References are at Appendix A.
5. Explanation of Acronyms and Terms. Acronyms and special terms used in this document are explained in the glossary.
6. Policy. The policy of USACE is to produce products and services that fully meet customers' expectations of quality, timeliness, and cost effectiveness, within the bounds of legal responsibility. There will be no compromise of functional, health, or safety requirements. Adherence to the principles outlined in ER 5-1-11 and ER 1110-1-12 will contribute to achieving this goal. Procedures for munitions response to MEC will be formulated to ensure harmony with the USACE Strategic Vision and should be executed in concert with activities presented in other USACE guidance.
7. Responsibilities. Personnel performing munitions response to MEC projects are responsible for safely executing these operations in accordance with the approved Safety Program including the Site Safety and Health Plan, Accident Prevention Plan, approved Work Plan, and all applicable laws, regulations, and policies. A detailed discussion of USACE organizational responsibilities for Military Munitions Response Program (MMRP) projects is presented in ER

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1110-1-8153. Safety and health requirements, responsibilities, and procedures for MEC operations are defined in ER 385-1-95 and EM 385-1-1.

8. General Safety Concerns and Procedures.

a. As a general rule, all unexploded ordnance (UXO) and discarded military munitions (DMM) will be detonated in the original position found. This is the safest method to effect final disposition of munitions. Engineering controls may be required based on site-specific conditions. If authorized by the approved Work Plan, UXO and DMM may be moved to a consolidated area for demolition in accordance with EP 1110-1-17.

b. All UXO will be destroyed daily unless circumstances beyond the contractor's control (e.g., unexpected weather storms, unavailability of donor explosives, etc.) preclude their destruction. If a UXO cannot be destroyed on the day of discovery, then the item will be secured and guarded until destruction can be accomplished. Under no circumstances will UXO be left unsecured overnight.

c. MEC operations will not be conducted until all applicable plans for the project in question are prepared and approved. Plans will be approved in accordance with ER 1110-1-8153. These plans will be based upon the concept of limiting exposure to the minimum number of personnel, for the minimum amount of time, to the minimum amount of military munitions consistent with safe and efficient operations.

d. Only UXO-qualified personnel will perform MEC procedures. As an exception, a UXO Technician I may assist in the performance of MEC procedures when under the supervision of a UXO Technician III or higher. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform MEC-related procedures when supervised by a UXO Technician III or higher. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III or higher. Contact the Military Munitions Center of Expertise (MM CX) for current UXO Technician ratings.

e. Personnel who will be handling military munitions will not wear outer or inner garments having static-electricity-generating characteristics. Materials made of 100-percent polyester, nylon, silk, and wool are highly static producing. Refer to DA Pam 385-64 for more information regarding non-static-producing clothing.

f. Prior to any action being performed on an ordnance item, all fuzing will be definitively identified if it is possible to safely do so without disturbing the ordnance item. This identification

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will consist of fuse type by function and condition (armed or unarmed) and the physical state/condition of the fuse, i.e., burned, broken, parts exposed/sheared, etc.

g. MEC operations will be conducted only during daylight hours.

h. In accordance with the requirements of EP 1110-1-18, UXO-qualified personnel involved in performing MEC procedures will be limited to a 40-hour work week, either four 10-hour days or five eight-hour days. Two consecutive work weeks will be separated by 48 hours of rest. A waiver to the 40-hour work week requirement may be granted for conventional munitions response to MEC projects using the following protocols:

(1) The contractor will be required to submit to the Contracting Officer for approval a comprehensive risk assessment for the work that is to be accomplished, taking into account a wide array of factors (e.g., fatigue, health, environment, type of work, etc.). This requirement must be met before an increase in the established 40-hour work week can commence.

(2) For those work schedules exceeding 40 hours, but not exceeding 60 hours, concurrence will be required by the USACE Project Manager, the Ordnance and Explosives Safety Specialist (OESS) supporting the Project Delivery Team, and the Ordnance and Explosives (OE) Safety Manager/Administrator, if assigned. Two (2) consecutive work weeks should be separated by 48 hours of rest.

(3) For proposed work schedules exceeding 60 hours, concurrence will be required by the District Commander and OE Director prior to approval by the Contracting Officer.

9. MEC Procedures Safety Precautions.

a. Every effort will be made to identify a suspect military munition. Under no circumstances will any MEC be moved in an attempt to make a definitive identification. The military munition will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown military munition is encountered, the onsite USACE representative will be notified immediately. If there is no onsite USACE representative, the Military Munitions (MM) Remedial Action District or the U.S. Army Engineering and Support Center, Huntsville (USAESCH) Chief of OE Safety will be notified as soon as possible. If research of documentation is required, it will be initiated by the MM CX. Following is additional guidance for the safe handling of military munitions:

(1) Projectiles containing base-detonating fuses are to be considered armed if the round has been fired.

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(2) Arming wires and pop out pins on unarmed fuses should be secured prior to moving military munitions.

(3) Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on military munitions. Such actions may arm or activate the items.

(4) Do not attempt to remove any fuse(s) from military munitions. Do not dismantle or strip components from any military munitions.

(5) UXO personnel are not authorized to render inert any military munitions found onsite.

(6) Military munitions will not be taken from the project property as souvenirs/training aids.

(7) Civil War era ordnance will be treated in the same manner as any other military munition.

b. Prior to entering a Munitions Response Area or Munitions Response Site (MRS) that contains Improved Conventional Munitions (ICMs) or submunitions, a Department of the Army (DA) waiver will be obtained by the affected installation or the executing MM Remedial Action District for FUDS properties. The waiver will be obtained in accordance with the requirements listed in DA Pam 385-64. The waiver will be routed through the MM CX for concurrence. If an ICM or submunition is found at a project property not previously known to contain ICMs or submunitions, work will cease. If the item is found as a result of a munitions response to MEC project, then the team that discovered the item will perform the disposal. If the item is found as a result of some other activity (e.g., construction support), then the notification and disposal procedures identified in the approved Work Plan will be used to dispose of the item. The discovered item will be identified, then properly disposed of (including guarding the item if disposition is to be delayed). Work will resume only when an ICM waiver has been obtained. For guidance on the preparation of waiver requests, contact the MM CX.

c. Any time munitions with unknown fillers are encountered during conventional munitions response to MEC project activities, all work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery. A team consisting of a minimum of two personnel will secure the area in accordance with the provisions identified in the approved Work Plan to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area. Personnel who could have been exposed to the unknown filler will not be released from the site until the presence of contamination has been verified by the U.S. Army Technical Escort Unit (TEU).

(1) On FUDS properties, the UXO team will notify the local Point of Contact (POC) designated in the Work Plan. The local POC will facilitate the Explosive Ordnance Disposal

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(EOD) response, and two personnel will secure the location until the EOD unit's arrival. If the local POC designated in the Work Plan is not the local law enforcement agency, then the local POC will inform the local law enforcement agency of the discovery if necessary. The EOD unit will notify the TEU and secure the area until TEU's arrival. After notifying the local law enforcement agency (when necessary), the executing MM Remedial Action District will notify their safety group and the MM CX of the actions taken. Refer to EP 75-1-3 for more detailed instructions on the procedures to take in the event munitions with unknown fillers are encountered on FUDS properties.

(2) Do not have munitions with unknown fillers exposed to direct sunlight after it has been excavated. Some fillers can detonate with the temperature change.

(3) On active or BRAC installations, the UXO team will notify the POC designated in the Work Plan.

d. Avoid inhalation and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.

e. UXO are the most dangerous military munitions that may be encountered. All military munitions, regardless of their appearance or condition, will be considered dangerous and managed as UXO until assessed otherwise by an UXO-qualified individual. Military munitions that have experienced abnormal environments, such as demilitarization by open burning, open detonation, accidents, fires or where components have been armed or affected by certain tests (e.g., fuse arming tests, jolt and jumble tests), are very unstable.

f. Do not rely on the color coding of military munitions for definitive identification. Military munitions having incomplete or improper color codes have been encountered.

g. Avoid approaching the forward area of a military munition until it can be determined whether or not the item contains a shaped charge. The explosive jet, which is formed during detonation, can be lethal at great distances. Assume that all shaped-charge munitions contain a piezoelectric (PZ) fuzing system until investigation proves otherwise. PZ fuzing systems are extremely sensitive, can function at the slightest physical change, and can remain hazardous for an indefinite period of time. In some cases, merely casting a shadow across a PZ fuse can cause it to detonate.

h. Approach an unfired rocket motor at a 45-degree angle from the rear. Accidental ignition can cause a missile hazard and hot exhaust.

i. Do not expose unfired rocket motors to any electromagnetic radiation (EMR) sources. See DA Pam 385-64 for safe separation distances from various sources of EMR.

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j. Consider an emplaced landmine to be armed until proven otherwise. It may be intentionally booby trapped. Many training mines contain spotting charges capable of inflicting serious injury.

k. Assume that a practice military munition contains a live charge until investigation proves otherwise. Expended pyrotechnic and practice devices can contain red or white phosphorus (WP) residue. Due to incomplete combustion, this residue may re-ignite spontaneously if the crust is broken and exposed to air.

l. Do not approach a smoking WP munition. Burning WP may detonate the explosive burster charge at any time.

m. Foreign ordnance was shipped to the United States for exploitation and subsequent disposal. Every effort will be made to research all applicable documentation prior to commencement of a project involving foreign ordnance.

10. Military Munitions and Commercial Explosives Storage.

a. On Department of Defense (DOD) installations, DOD 6055.9-STD and Service requirements (Army – AR 385-64; Navy – NAVSEA OP 5; Air Force – AFM 91-201) will be met. For the remainder of this pamphlet, reference to DOD standards (i.e., DOD 6055.9-STD) also implies that Service explosives safety publications will be adhered to. Generally, the contractor may be able to use an existing explosives storage facility on an installation that meets DOD standards. If not, the contractor will establish a temporary storage facility. The compatibility of explosives defined in DOD 6055.9-STD, will be followed. Recovered munitions awaiting final disposition will not be stored with serviceable explosives. Commercial explosives will be assigned a DOD hazard classification (e.g., 1.1, 1.2, etc.) and storage compatibility grouping by the U.S. Army Technical Center for Explosives Safety prior to being stored on a military installation. Contact the MM CX for a current listing of commercial explosives that have been assigned a DOD hazard classification.

b. Off DOD installations, the contractor will be responsible for establishing a temporary explosives storage area. This temporary explosives storage area will meet local, state, 27 CFR 55, 29 CFR 1910.1201, and DOD 6055.9-STD requirements to the greatest extent practicable.

c. Temporary Explosives Storage Area.

(1) It is required that each contractor establish a temporary explosive storage area for each project when explosives will be stored for the purpose of disposing of military munitions onsite. Recovered military munitions may have to be stored onsite depending on the final disposal method selected.

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(2) Magazines must meet the requirements of 27 CFR 55 and each magazine must have a Net Explosive Weight (NEW) and hazard classification established for the explosives to be stored. The NEW is calculated in accordance with the procedures identified in DA Pam 385-64.

(3) EM 1110-1-4009 provides the criteria for establishing temporary storage areas using Bureau of Alcohol, Tobacco, and Firearms (ATF), Type II Magazines.

(4) When a project is being conducted on an installation, the installation has an approved storage facility, and permission to store the demolition explosives in an approved storage facility is obtained from the installation and/or Major Army Command (MACOM), as applicable, the explosives will be stored in accordance with the approved procedures used by the installation. Otherwise, the contractor will establish a temporary storage area using ATF, Type II magazines. Installations require MACOM approval for storage of commercial explosives. Contact the MM CX for procedures to be used to obtain MACOM approval.

(5) A log of the stored material will be maintained at the storage facility and at the project administrative office.

d. Temporary Explosives Storage Area Explosives Siting Requirements.

(1) EM 1110-1-4009 provides guidance for siting an explosives storage magazine.

(2) Compliance with 29 CFR 1910.1201 and DOD 6055.9-STD is required.

(a) The following facilities will be located at the Inhabited Building Distance (IBD) from the storage magazines. For any magazine (ATF Type II, Earth Covered, Aboveground, etc.) use the standards identified in DOD 6055.9-STD (Revision 3).

- Office facilities occupied by administrative support personnel.
- Quantity-Distance (Q-D) from Explosive Storage Magazines to Scrap Vendor Pickup Points. Scrap pickup points will be positioned as far as possible from project magazines, consistent with operational needs. At a minimum, the scrap pickup point will be sited at the Public Traffic Route (PTR) from the magazines.
- The distances identified in DOD 6055.9-STD apply to all inhabited buildings.

(b) There is no Minimum Separation Distance (MSD) required from the explosives storage area to a MEC work area where MEC procedures are ongoing. The explosives storage area will be sited at a MSD of one hazardous fragment per 600 square feet based on the Munition with the Greatest Fragmentation Distance (MGFD) from the MEC work area boundary.

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(c) Siting of Magazines to PTRs. The type of distance (IBD, PTR, etc.) required to a PTR depends on the traffic density. The criteria, defined in DOD 6055.9-STD include:

- For PTRs, the minimum fragment and debris distance for Hazard Division 1.1 ammunition and explosives will be based on the traffic density considered at three levels: high traffic density, medium traffic density, and low traffic density. The traffic density will be averaged over a normal (non-holiday) week in terms of the number of passengers during a 24-hour period.
- High Traffic Density. If routes have 10,000 or more car and/or rail passengers per day, or 2,000 or more ship passengers per day, then the IBD criteria apply.
- Medium Traffic Density. If routes have 400 or more, but less than 10,000 or more car and/or rail passengers per day, or 80 or more, but less than 2,000 ship passengers per day, then 60 percent of the specified minimum fragment distance for the IBD applies.
- Low Traffic Density. If routes have less than 400 cars and/or rail passengers per day, or less than 80 ship passengers per day, then no minimum fragment distance is required. Minimum distance will be based on the blast criteria (K24/K30) only.

(3) In cases where the facility cannot meet the intermagazine, IBD, and PTR Q-D requirements specified in DA Pam 385-64 and DOD 6055.9-STD, a barricading plan or other engineering controls to protect the public from accidental detonation will be submitted to the MM CX for approval.

(4) Material Potentially Presenting an Explosive Hazard (MPPEH) Processing Areas. For MPPEH that has been inspected in the MEC work area and brought to a processing area for metals segregation, certification, verification, containerization, etc., apply the intraline distance from the storage magazines to the scrap processing area, based on the quantity of explosives at the magazine. See the appropriate tables in DOD 6055.9-STD.

(5) Siting Magazines at Operational Installations.

(a) On-Post Roads. For magazines supporting munitions response to MEC work at operational installations, on-post roads are normally not considered PTRs and no Q-D applies from the magazine to them. Exceptions are as follows:

- On-post roads open to the public are PTRs.
- On-post roads that are closed to the public, but are used by installation personnel who are unrelated to the installation's ammunition mission are considered PTRs.

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(b) Installation Personnel and Operations.

- Installation ammunition personnel and operations. Site the magazine at the intraline distance to these exposures (note: magazine distance applies from installation explosives locations to magazines supporting munitions response to MEC projects).
- Installation non-ammunition personnel and operations. Site the magazine at the IBD to these exposures.

e. Lightning Protection for Explosives Storage Areas.

(1) Each magazine will be provided lightning protection in accordance with DA Pam 385-64. The provisions of the National Fire Protection Association (NFPA) 780, which are consistent with Army guidance, may be used to supplement Army guidance where necessary.

(2) DOD 6055.9-STD requires functional lightning protection for all explosives storage areas.

(3) Approved explosives storage areas on active installations will have a Lightning Protection System (LPS) installed.

(4) Temporary explosives storage areas used to support an on-going project will have a LPS. Existing earth-covered magazines at a FUDS project property will have a LPS.

(5) Prior to storing explosives in any magazine with an installed LPS, the system will be inspected and tested to ensure it is functional. Existing facilities without a LPS will have a LPS installed and tested to ensure it is functional prior to storing explosives. Inspection and testing criteria are contained in DA Pam 385-64.

(6) NFPA 780 allows the metal walls of the magazine to act as both the air terminal and down conductor of a LPS, provided the portable magazine meets the following criteria: magazines manufactured entirely from metal that are at least 3/16 inches thick and that have doors bonded to the side of the magazine. ATF-approved, portable Type II magazines meet these criteria. Lightning protection is completed by grounding the magazine in accordance with EM 1110-1-4009; however, the grounding system will be inspected and tested in accordance with DA Pam 385-64. The Interim Holding Facilities (IHF) used for Recovered Chemical Warfare Materiel (RCWM) projects do not meet these criteria; therefore, they will have a LPS designed, installed, and tested prior to use, if the IHF is to be sited for explosively-configured RCWM. If the IHF is not sited for explosively-configured items, a LPS is not required.

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(7) When more than one portable magazine is used on a project property, they will be separated by a minimum of 2 meters (6.5 feet) if they are grounded separately, or they will be bonded to a common grounding system if the 2 meter (6.5 foot) criteria cannot be met. Fences installed around magazines will be at least 2 meters (6.5 feet) from the magazine or bonded into the grounding system.

f. Munitions Debris Storage Inside the Fenced Explosives Storage Area. Certified, verified, containerized munitions debris may be stored in the fenced explosives storage area. However, the munitions debris containers will be made of non-flammable materials. Wood or cardboard containers are not acceptable as they constitute a fuel source in case of fire near the magazine.

g. Fire Protection.

(1) A fire plan for either an on-installation or off-installation explosives storage facility will be prepared and coordinated with the local fire department.

(2) Clear all combustible material a minimum of 15.25 meters (50 feet) around portable magazines. Do not store any combustible materials within 15.25 meters (50 feet) of any magazine.

(3) Placarding.

(a) On DOD Installations. Affix a fire symbol to the magazine in accordance with DA Pam 385-64.

(b) FUDS and Other Munitions Response to MEC Projects Not on DOD Operational Installations. Placarding of magazines will be performed in accordance with local rules and regulations.

(c) Routine emergency response drills will be conducted in accordance with the approved Work Plan to familiarize the response personnel with the hazards.

h. Physical Security. A physical security survey will be conducted in accordance with AR 190-11 to determine if fencing or guards are required. For BRAC or active installations the physical security survey will be coordinated through the Provost Marshall's office. For FUDS, this survey will be coordinated with local law enforcement agencies. See EP 1110-1-18 for additional details on physical security.

(1) Generally, a fence around the magazine is not needed, in accordance with 27 CFR 55. However, the degree of protection needed to prevent the theft of the military munitions will be provided.

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(2) USACE contractors must be aware of 49 CFR 172, Subparts H and I concerning the offering, preparing, or transporting of designated hazardous materials, as well as the necessary security requirements.

i. Magazines for Storage of RCWM. Refer to EP 75-1-3 and EP 1110-1-18 for RCWM IHF siting requirements.

j. Requirements for the physical security of a RCWM IHF are contained in EP 75-1-3.

11. Military Munitions Transportation, Offsite. In the event that military munitions will be transported offsite, the provisions of EP 1110-1-18 will be followed. In addition, USACE contractors are prohibited from transporting UXO offsite for destruction until the provisions of Technical Bulletin 700-2 have been met.

12. Military Munitions Transportation, Onsite. The following safety procedures will be followed for the transportation of military munitions that are acceptable to be moved/transported onsite:

a. Do not transport WP munitions unless they are immersed in water, mud, or wet sand.

b. If loose pyrotechnic, tracer, flare, or similar mixtures are to be transported, they will be placed in Number 10 mineral oil or equivalent to minimize the fire and explosion hazards.

c. Incendiary-loaded munitions will be placed on a bed of sand and covered with sand to help control the burn if a fire should start.

d. If an unfired rocket motor will be transported, it will be positioned in the vehicle parallel to the rear axle and secured in place with sandbags. This will afford maximum protection for the personnel operating the vehicle.

e. If a base-ejection projectile will be transported to a disposal facility, the longitudinal axis of the projectile will be oriented parallel to the rear axle and secured in place with sandbags. This will afford maximum protection for the personnel operating the vehicle.

f. Military munitions with exposed hazardous fillers, such as High Explosive, will be placed in appropriate containers with packing material to prevent migration of the hazardous fillers. Padding will be added to protect the exposed filler from heat, shock, and friction.

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13. Exclusion Zone Operations. On munitions response to MEC projects, it is the responsibility of the contractor's Unexploded Ordnance Safety Officer (UXOSO) to establish the exclusion zone (EZ) for each MRS.

a. The purpose of the EZ is to protect nonessential personnel from blast overpressure and fragmentation hazards. Calculating EZs with respect to intentional and unintentional detonations is discussed below. Approved engineering controls may be used to reduce the EZ for either intentional or unintentional detonations.

(1) Intentional Detonations. The minimum separation distances specified in DOD 6055.9-STD will be used unless lesser distances have been calculated using TP Number 16.

(2) Unintentional Detonations. If the identity of the military munitions to be found is unknown, the minimum separation distance specified in DOD 6055.9-STD will be used to establish the EZ. If the identity of the military munitions to be found is known, use TP Number 16 to determine the criteria for establishing the EZ.

b. When multiple teams are working onsite, a Team Separation Distance (TSD) will be established. The minimum TSD will be the greater of 61 meters (200 feet), the hazardous fragment distance of the MGF (lesser distance authorized if supported by a hazard assessment), or the K50 (0.9 pounds per square inch) overpressure distance.

c. While MEC procedures are being conducted, only personnel essential for the operation and authorized visitors will be allowed to enter a MRS EZ. When nonessential personnel enter the EZ, all MEC procedures will cease. In addition to this work stoppage, the following actions will be taken:

(1) The individual(s) will receive a safety briefing and sign the visitors log prior to entering the EZ.

(2) The individual(s) will be escorted by a UXO-qualified individual.

d. All personnel working within the EZ will comply with the following:

(1) There will be no smoking within the EZ, except in areas designated by the UXOSO.

(2) There will be no open fires for heating or cooking (gas stoves, grills, etc.) within the EZ, except where authorized by the UXOSO. If open fires for heating or cooking are to be allowed on the project property, then the appropriate fire fighting measures and plans need to be established in the approved Work Plan.

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(3) During geophysical detection operations, personnel will not wear any metal (e.g., rings, watches, keys, etc.) that would interfere with the instrument's operation.

e. On RCWM project properties, EZs will be established in accordance with EP 75-1-3.

14. Authorized Visitors.

a. Explosives Safety Policy.

(1) In accordance with DOD 6055.9-STD and DA Pam 385-64, it is DOD and DA policy to limit the exposure to a minimum number of persons, for a minimum time, to the minimum amount of ammunition and explosives (i.e., MEC) consistent with safe and efficient operations.

(2) DA Pam 385-64 provides the following discussion concerning personnel limits:

(a) Tasks not necessary to the operation will be prohibited within the immediate area of the hazard produced by the operation. (For USACE MMRP projects, multi-discipline and multiple MEC project teams performing tasks required to execute the project may be in the EZ while MEC procedures are being performed as long as minimum team separation distances are maintained.)

(b) Personnel limits, to include authorized visitors, will be clearly posted for each operation and must not be exceeded during the operation. (For USACE MMRP projects, personnel limits are based on the approved Work Plan designating the number and types of teams that may be required to complete the field operations.)

(c) Personnel not needed for the operation will be prohibited from visiting. (For USACE MMRP projects, essential personnel and authorized visitors, as defined in this guidance, may visit the EZ while MEC procedures are being conducted.)

(3) DA Pam 385-64 and ER 385-1-95 require the contractor to establish an EZ around each work area where MEC procedures are being performed. The EZ is established to protect non-essential personnel from the damaging effects of blast overpressure and fragmentation should an unintentional detonation occur. The EZ will be delineated in the approved Work Plan, Explosives Siting Plan, and Explosives Safety Submission.

b. Responsibilities.

(1) Authorized visitors will obtain written approval from the executing district's Safety and Occupational Health Office (SOHO).

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(2) Project team members listed in the Quality Assurance Surveillance Plan (QASP) do not require additional SOHO approval. They will be considered as authorized visitors when performing assigned quality assurance functions. If a QASP is not available, or personnel are not listed in the QASP, SOHO approval is required.

(3) The contractor is responsible for considering all explosives safety policies and principles when making determinations regarding EZ operations and personnel limits.

(4) The contractor is responsible for posting personnel limits and ensuring all personnel are aware of and comply with the posted limits.

(5) All personnel entering, or working in, EZs are responsible for ensuring personnel limits are not exceeded.

c. Requirements and Procedures.

(1) All requests for approval as an authorized visitor for entry into the EZ during MEC procedures will be submitted through the Project Manager (PM). The PM will provide the request to the project OE safety Specialist for review prior to transmitting it to the executing district's SOHO for approval. An exception to this is provided in paragraph 14.b.(2) above. All visitor authorization requests will:

- (a) Describe the purpose of the visit and the tasks to be performed.
- (b) Explain why the tasks must be performed during MEC procedures.
- (c) Specify whether the visit will be a single visit or one in a series of visits.
- (d) State the frequency of the visits and the time required to perform the task.

(2) The on-site UXOSO will ensure:

(a) The documentation approving the authorized visitors is reviewed for adequacy based on this guidance and the tasks to be performed. This documentation will become part of the project file.

(b) Non-essential personnel, which include unauthorized visitors, are prohibited within the EZ where MEC procedures are being performed.

(c) All authorized visitors are provided a safety briefing prior to entering the EZ and a UXO-qualified escort regardless of their qualifications.

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(d) Posted personnel limits are not exceeded while MEC procedures are being conducted. If more than the posted number of personnel are in the EZ while MEC procedures are being performed, MEC procedures must cease and the required number of personnel must leave before they may continue.

(e) Personnel limits are posted at or near the contractor's on-site office. As a minimum, the limits should be posted at a central site accessible to all personnel.

(f) Personnel limits are a topic covered during the contractor's daily safety briefings.

(3) Once the personnel limits are established, the contractor has the flexibility to manage team sizes to accomplish the mission provided the personnel limits are not exceeded.

15. Munitions Response Excavation Operations.

a. By their nature, MEC procedures/anomaly excavations are hazardous and certain calculated risks will be taken. Ingenuity, judgment, common sense, and above all, the mastery of EOD techniques and observance of EOD principles will determine success or failure. UXO-qualified technicians will be alert at all times and be in observance of EOD safety precautions. EOD/UXO-qualified personnel are the most experienced and best qualified to perform these operations.

b. Hand excavation is the most reliable method for uncovering a military munition. However, hand excavation exposes personnel to the hazard of detonation. Only EOD or UXO-qualified personnel are to perform these operations.

c. Specific Procedures for Anomaly Excavation.

(1) Start all excavations from the side of the anomaly. Carefully dig from the side until identification of the anomaly is made. Excavation operations, whether by hand or Earth-Moving Machinery (EMM), will employ a step-down or offset access method. Under no circumstances will any excavation be made directly over suspected military munitions.

(2) Clear debris/dirt from the subsurface anomaly only enough to permit identification of the anomaly and to apply the necessary MEC procedure.

(3) All UXO will be blown in place, when possible.

(4) Move with slow, deliberate motions; avoid abrupt moves.

(5) Avoid impacting, jarring, or striking UXO.

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(6) Do not subject UXO to shock, rough handling, heat, or any other force.

(7) Observe EMR precautions in accordance with DA Pam 385-64.

d. EMM may be used to excavate overburden from suspected military munitions. EMM will not be used to excavate within 12 inches of a suspected military munition. Once the EMM is within 12 inches of the suspected military munition, the excavation will be completed by hand excavation methods. Personnel who are not UXO-qualified may operate EMM only when supervised by a UXO Technician III or higher.

(1) If more than one earth-moving machine is to be used onsite, the same minimum separation distances required for multiple work teams apply.

(2) EMM operations will be conducted within the guidelines of EM 385-1-1 and 29 CFR 1926, subpart P.

16. Procedures for Assessing Munitions with Unknown Fillers.

a. Background.

(1) For explosives and chemical safety reasons, the complete identification of recovered munitions is required before destruction or disposal. This is particularly true with regard to munitions that can be filled with chemical warfare materiel (CWM) and could present a downwind chemical vapor hazard.

(2) Many munitions have sufficient physical properties (e.g., design characteristics, markings) that allow USACE OESS and UXO personnel to positively identify the munition and the filler. However, the design or physical condition of some munitions may not allow their complete identification by visual inspection.

(3) Munitions whose external design does not always allow for positive identification of their filler include: 4.2-inch mortars (M1, M2, and the M2A1 models) and Livens projectiles (MK II (M1) and MKIIAI).

(a) Because the 4-inch Stokes mortar's physical dimensions (see Appendix B) clearly indicate whether or not it contains a suspect chemical filler, it is not included in this list.

(b) Because this list is not all inclusive, the MM CX should be contacted about other munitions when questions arise.

(4) The identification of the filler of some munitions is very difficult, if not impossible, through visual inspection when the munition has been used or otherwise impacted (e.g., disposed

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of after ineffective treatment) or exposed to the environment (e.g., buried as a means of disposal) for years.

(5) Only EOD or TEU will be allowed to determine the most likely filler of these munitions.

b. Procedures. When performing munitions responses on USACE project properties and the filler of a munition listed above cannot be determined, the following procedures will be followed. Refer to EP 75-1-2 for additional details on procedures to be followed in the event that munitions with unknown fillers are identified on conventional munitions response to MEC project properties.

(1) On conventional munitions response to MEC project properties, contact the POC identified in the approved Work Plan for performing the assessment or response (i.e., military EOD or TEU). Typically, the Work Plan will address how to “safe the hole / item” to mitigate the possible downwind hazards pending the arrival of the appropriate response personnel.

(2) On RCWM projects, TEU will normally be present at the project property and will perform the assessment as part of their daily routine and per their procedures.

(3) If the assessment has ruled out RCWM as a filler, then the item will be returned to USACE for disposal operations as specified in the approved conventional munitions response to MEC Work Plan.

(4) If the assessment indicates RCWM as a filler:

(a) On a RCWM project, TEU will package and secure the item per the approved Chemical Safety Submission, usually on site.

(b) On a conventional munitions response to MEC project, TEU will assume control of the item. (Note: TEU may require some logistical support during the assessment process.)

(5) The use of these procedures is a precautionary measure to confirm that the munition can be safely destroyed; to help ensure that an uncontrolled, unintentional release of CWM does not occur; and to validate site-specific information.

c. It is important that terminology used not cause unnecessary public or regulatory concern. Generally, these munitions should be referred to as munitions with unknown fillers, rather than suspect chemical munitions.

17. Military Munitions Disposal Operations. All disposal operations will be conducted in accordance with TM 60A-1-1-31, EP 1110-1-17, and the unnumbered USAESCH publication

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entitled Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites.

a. As a general rule, all disposal operations will be accomplished by electrical means to ensure maximum safety. There are exceptions to this requirement in situations where static electricity or EMR hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). The following precautions from DA Pam 385-64 are to be followed:

(1) Premature detonation of electric blasting caps by induced current from radio frequency signals is possible. Refer to DA Pam 385-64 for minimum safe distance with respect to transmitter power and indication of distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

(2) Lightning is a hazard with respect to all field activities. Lightning strikes, even at distant locations, may cause extremely high local earth currents. Effects of remote lightning strikes are multiplied by their proximity to conducting elements such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduits. The only safe procedure is to suspend all field activities when an electrical storm approaches to within 5 miles of the project location.

(3) Electric power lines also pose a hazard with respect to electric initiating systems. It is recommended that any disposal operation closer than 155 meters (517 feet) to electric power lines be done with a non-electric system.

b. The only acceptable disposal method is the one stated in the appropriate TM 60 Series manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.

c. If justified by the situation, protective measures to reduce shock, blast overpressure, and fragmentation will be taken. The MM CX will assist in any design work and will review for approval all proposed protective measures.

d. MSDs for personnel during MEC disposal operations will be in accordance with DOD 6055.9-STD, TP 16, or the distance provided by the MM CX.

e. During open detonation operations, personnel will be located away from lifting lugs, strong backs, base plates, etc..

f. Once disposal operations are completed, a thorough search of the immediate area will be conducted with a magnetometer to ensure that a complete disposal was accomplished.

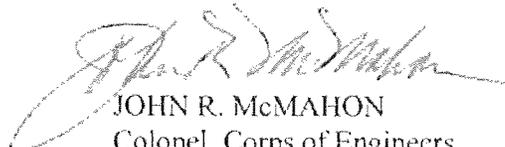
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f. Once disposal operations are completed, a thorough search of the immediate area will be conducted with a magnetometer to ensure that a complete disposal was accomplished.

g. Inert ordnance will not be disposed of as scrap until the internal fillers/voids have been exposed and unconfined.

FOR THE COMMANDER:

2 Appendices
Appendix A - References
Appendix B -- 4-inch Stokes Mortar
Measurements



JOHN R. McMAHON
Colonel, Corps of Engineers
Chief of Staff

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APPENDIX A References

27 CFR 55, Commerce in Explosives.

29 CFR 1910.1201, Retention of DOT Markings, Placards, and Labels.

29 CFR 1926, Subpart P, Excavations.

49 CFR 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements.

DOD 6055.9-STD

Department of Defense Ammunition and Explosives Safety Standards, Latest Revision.

DODD 4715.11

Environmental and Explosive Safety Management on Operational Ranges Within the United States.

Department of Defense Explosives Safety Board Technical Paper No. 16
Methodologies for Calculating Primary Fragment Characteristics.

Technical Bulletin 700-2

Department of Defense Ammunition and Explosives Hazard Classification Procedures.

AR 190-11

Physical Security of Arms, Ammunition, and Explosives.

AR 385-64

U.S. Army Explosives Safety Program.

DA Pam 385-64

Ammunition and Explosives Safety Standards.

FM 3-09.21

Tactics, Techniques and Procedures for the Field Artillery Battalion.

TM 60A-1-1-31

Explosive Ordnance Disposal Procedures: General Information on Explosive Ordnance Disposal Procedures.

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ER 5-1-11
Program and Project Management.

ER 385-1-95
Safety and Health Requirements for Ordnance and Explosives (OE) Operations.

ER 1110-1-12
Quality Management.

ER 1110-1-8153
Ordnance and Explosives Response

EP 75-1-2
Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and
Radioactive Waste (HTRW) and Construction Activities.

EP 75-1-3
Recovered Chemical Warfare Materiel (RCWM) Response.

EP 1110-1-17
Establishing a Temporary Open Burn and Open Detonation Site for Conventional Ordnance and
Explosives Projects.

EP 1110-1-18
Ordnance and Explosives Response.

EM 385-1-1
Safety and Health Requirements Manual.

EM 1110-1-4009
Ordnance and Explosives Response

U.S. Army Engineer and Support Center, Huntsville Document
Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and
Explosives (OE) Sites, U.S. Army Engineering and Support Center, Huntsville, Terminology
Update March 2000. This document is available on the Internet at
<http://www.hnd.usace.army.mil/oew/proceddocs.asp>.

AFM 91-201
Explosives Safety Standards.

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NAVSEA OP 5

Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation, and Shipping.

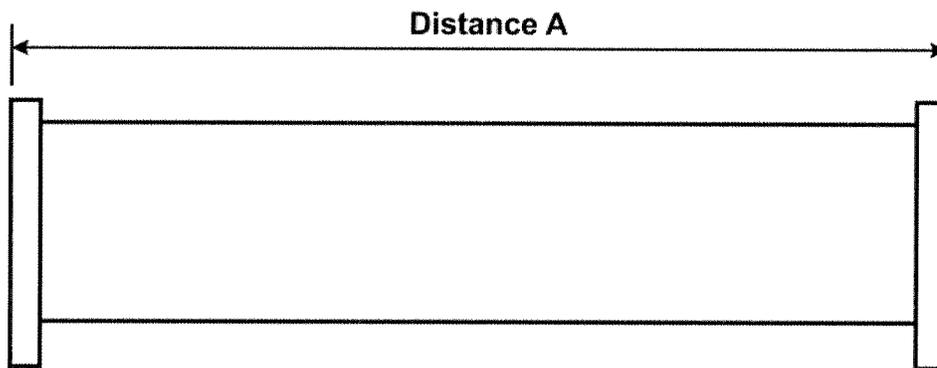
NFPA 780

Standard for the Installation of Lightning Protection Systems.

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APPENDIX B
4-Inch Stokes Mortar Round Measurements

Distance A is measured from outside of the windage ring to outside of the windage ring without regard to fuze mounting location or tail boom.



Distance A measurement for the following type of mortar fillers are:

Chemical Gas - MK I = 16 inches, MK III = 16³/₄ inches
Smoke Filled - MK I = 15 inches
Incendiary Filled - MK I = 14 inches

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GLOSSARY

Section I Acronyms

AFM.....	Air Force Manual
AR.....	Army Regulation
ATF.....	Bureau of Alcohol, Tobacco, and Firearms
BRAC.....	Base Realignment and Closure
CFR.....	Code of Federal Regulations
CWM.....	Chemical Warfare Materiel
DA.....	Department of the Army
DA Pam.....	Department of the Army Pamphlet
DMM.....	Discarded Military Munition
DOD.....	Department of Defense
EM.....	Engineer Manual
EMM.....	Earth-Moving Machinery
EMR.....	Electromagnetic Radiation
EOD.....	Explosive Ordnance Disposal
EP.....	Engineer Pamphlet
ER.....	Engineer Regulation
EZ.....	Exclusion Zone
FUDS.....	Formerly Used Defense Sites
HTRW.....	Hazardous, Toxic, and Radioactive Waste
IBD.....	Inhabited Building Distance
ICM.....	Improved Conventional Munition
IHF.....	Interim Holding Facility
LPS.....	Lightning Protection System
MACOM.....	Major Army Command
MC.....	Munitions Constituents
MEC.....	Munitions and Explosives of Concern

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MGFD.....	Munition with Greatest Fragmentation Distance
MM	Military Munitions
MM CX.....	Military Munitions Center of Expertise
MMRP.....	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
MSD.....	Minimum Separation Distance
NAVSEA OP	Naval Sea Systems Command Ordnance Pamphlet
NEW	Net Explosive Weight
NFPA	National Fire Protection Association
OE	Ordnance and Explosives
OESS.....	OE Safety Specialist
pdf.....	Portable Document Format
POC.....	Point of Contact
PTR	Public Traffic Route
PZ.....	Piezoelectric
Q-D	Quantity-Distance
QAR.....	Quality Assurance Representative
QASP	Quality Assurance Surveillance Plan
RCWM.....	Recovered Chemical Warfare Materiel
SOHO.....	Safety and Occupational Health Office
STD.....	Standard
TEU.....	U.S. Army Technical Escort Unit
TM.....	Technical Manual
TP	Technical Paper
TSD.....	Team Separation Distance
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
UXO.....	Unexploded Ordnance
UXOSO.....	Unexploded Ordnance Safety Officer
WP.....	White Phosphorus

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Section II

Terms

Authorized Visitors

DOD, DA, USACE, or other personnel (MM CX, Department of Defense Explosives Safety Board, HQ Safety, etc.) conducting project or mission related functions, e.g., Quality Assurance Representatives (QARs), safety and quality inspectors (including geophysicists performing quality assurance functions), and project management. Authorized visitors must be escorted while in the EZ and be approved for entry into the EZ in accordance with this guidance. No more than 2 authorized visitors will be permitted in the EZ at any given time.

Defense Sites

Locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions. (10 U.S.C. 2710(e)(1))

Discarded Military Munitions (DMM)

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

Essential Personnel

USACE and contractor project personnel necessary for the safe and efficient completion of field operations conducted in an EZ. This is limited to: contractor work team members including the Unexploded Ordnance (UXO) Safety Officer (UXOSO), UXO Quality Control Specialist, Senior UXO Supervisor, and a USACE Ordnance and Explosives (OE) Safety Specialist.

Exclusion Zone (EZ)

A safety zone established around a MEC work area where MEC procedures are being conducted.

Improved Conventional Munition (ICM)

ICMs are delivered by 105 and 155 Howitzers and the Multiple Launch Rocket System (rockets and missiles). There are three types of ICM: 1) Antipersonnel (APICM); 2) Antipersonnel, Antimaterial (APAM); and 3) Dual Purpose (DPICM). (FM 3-09.21)

Material Potentially Presenting an Explosive Hazard (MPPEH)

Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or

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

MEC Procedures

Procedures which include, but are not limited to, the following actions performed by a UXO-qualified individual:

- a. Gaining access to (manual excavation) and identifying subsurface anomalies and assessing the condition of buried MEC.
- b. Identifying and assessing the condition of surface MEC.
- c. Recovering and making final disposal of all MEC.

MEC-Related Procedures

Procedures which include, but are not limited to, the following actions which may be performed by a non-UXO-qualified individual:

- a. Locating and marking subsurface anomalies.
- b. Locating and marking suspected surface MEC.
- c. Transporting and storing recovered MEC.
- d. Utilizing EMM to excavate overburden from suspected MEC.

Military Munitions

Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

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The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4)).

Munitions Constituents (MC)

Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.
(10 U.S.C. 2710(e)(4)).

Munitions and Explosives of Concern (MEC)

This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means:

- a. Unexploded Ordnance (UXO), as defined in 10 U.S.C. 2710(e)(9);
- b. Discarded Military Munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or
- c. Munitions Constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

Munitions Response

Response actions, including investigation, removal and remedial actions to address the explosives safety, human health, or environmental risks presented by unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC).

Munitions Response Area (MRA)

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

Munitions Response Site (MRS)

A discrete location within a MRA that is known to require a munitions response.

Personnel Limits

The maximum number of personnel that may be in the EZ at any one time. This includes essential personnel as defined above, plus 2 authorized visitors.

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Submunition

Any munition that, to perform its task, separates from a parent munition. (DODD 4715.11)

Unexploded Ordnance (UXO)

Military munitions that:

- a. Have been primed, fused, armed, or otherwise prepared for action;
 - b. Have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and
 - c. Remain unexploded either by malfunction, design, or any other cause.
- (10 U.S.C. 101(e)(5))

UXO-Qualified Individual

Individual meeting the requirements for the positions of UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor. For qualification requirements, refer to EP 1110-1-18.

APPENDIX C

INJURY/ILLNESS REPORTING PROCEDURE



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: _____
Subsidiary Health and Safety Representative

cc: _____
Workers Compensation Administrator

Project name: _____

Project number: _____

Prepared by: _____

Position: _____

Office: _____

Telephone number: _____

Fax number: _____

Information Regarding Injured or Ill Employee	
Name: _____	Office: _____
Home address: _____ _____	Gender: M <input type="checkbox"/> F <input type="checkbox"/> No. of dependents: _____
Home telephone number: _____	Marital status: _____
Occupation (regular job title): _____	Date of birth: _____
Department: _____	Social security number: _____
Date of Accident: _____	Time of Accident: _____ a.m. <input type="checkbox"/> p.m. <input type="checkbox"/>
Time Employee Began Work: _____	<input type="checkbox"/> Check if time cannot be determined
Location of Incident	
Street address: _____	
City, state, and zip code: _____	
County: _____	
Was place of accident or exposure on employer's premises? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Information About the Incident	
What was the employee doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the employee was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from hand sprayer"; "Daily computer key-entry"	
What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time"	

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

What was the injury or illness? Describe the part(s) of the body affected and how it was affected. Be more specific than "hurt," "pain," or "sore." Examples "Strained back"; "Chemical burn, right hand"; "Carpal tunnel syndrome, left wrist"

Describe the Object or Substance that Directly Harmed the Employee: Examples: "Concrete floor"; "Chlorine"; "Radial arm saw." If this question does not apply to the incident, write "Not applicable."

Did the employee die? Yes No Date of death: _____

Was employee performing regular job duties? Yes No

Was safety equipment provided? Yes No Was safety equipment used? Yes No

Note: Attach any police reports or related diagrams to this report.

Witness (Attach additional sheets for other witnesses.)

Name: _____

Company: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Medical Treatment Required? Yes No First aid only

Name of physician or health care professional: _____

If treatment was provided away from the work site, provide the information below.

Facility name: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Was the employee treated in an emergency room? Yes No

Was the employee hospitalized over night as an in-patient? Yes No

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:
 Injury Illness

Result of Incident:
 First aid only
 Days away from work
 Remained at work but incident resulted in job transfer or work restriction
 Incident involved days away and job transfer or work restriction
 Medical treatment only

No. of days away from work _____
Date employee left work _____
Date employee returned to work _____
No. of days placed on restriction or job transfer: _____

OSHA Recordable Case Number _____

To Be Completed by Human Resources

Social security number: _____
Date of hire: _____ Hire date for current job: _____
Wage information: \$ _____ per Hour Day Week Month
Position at time of hire: _____
Current position: _____ Shift hours: _____
State in which employee was hired: _____
Status: Full-time Part-time Hours per week: _____ Days per week: _____
Temporary job end date: _____

To Be Completed during Report to Workers Compensation Carrier

Date reported: _____ Reported by: _____
Confirmation number: _____
Name of contact: _____
Field office of claims adjuster: _____

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

APPENDIX D
MEDICAL DATA SHEET

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by on-site personnel and kept in a central location during the execution of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project Tooele Open Burning Open Detonation Unit Surface Soil Sampling

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Name of Next Kin _____

Drug or other Allergies _____

Particular Sensitivities _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals _____

What medications are you presently using? _____

Do you have any medical restrictions? _____

Name, Address, and Phone Number of personal physician: _____

I am the individual described above. I have read and understand this SSHP.

Signature

Date

APPENDIX E
SAFE WORK PERMITS

MOBILIZATION AND DEMOBILIZATION
TOOELE OPEN BURN/OPEN DETONATION UNIT
TOOELE VALLEY, UTAH

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Mobilization / Demobilization activities.

II. Primary Hazards: Potential hazards associated with this task: lifting; pinches and compressions; slip, trip and falls; vehicular and foot traffic; ambient temperature extremes; insect and animal bites, and inclement weather

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector _____ TtNUS
Equipment Inspection required Yes No Initials of Inspector _____ TtNUS

V. Protective equipment required

Level D Level B
 Level C Level A

Respiratory equipment required

Yes Specify on the reverse
 No

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None expected during this task	_____	_____	_____
_____	_____	_____	_____

Primary Route(s) of Exposure/Hazard: NA

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

- | | |
|---|--|
| Hard-hat..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio/Cellular Phone <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type – Work) <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Impermeable apron..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe work shoes or boots.... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Chemical resistant boot covers <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| High visibility vest..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Tape up/use insect repellent <input type="checkbox"/> Yes <input type="checkbox"/> No |
| First Aid Kit..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Fire extinguisher <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Shower/Eyewash <input type="checkbox"/> Yes <input type="checkbox"/> No | Other..... <input type="checkbox"/> Yes <input type="checkbox"/> No |

Modifications/Exceptions: Various tasks performed as part of mobilization/demobilization require additional PPE. Tasks and site conditions will determine the need for additional PPE (hard hats, safety glasses, protective gloves, hearing protection, reflective vests, etc.).

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Identified and Isolated (Splash and containment barriers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Use safe lifting/carrying techniques. Use additional PPE based on the hazards that are associated with each task. Use work gloves when cutting boxes or handling sharp tools/cutting devices. Safety glasses will be required whenever eye hazards are present. Reflective vests will be used when working near roadways or areas of operating vehicles/equipment. Identify/remove potential physical hazards and mark areas or hazards that cannot be removed. Keep work area free of ground clutter.

Permit Issued by: _____ Permit Accepted by: _____

SOILS SAMPLING
TOOELE OPEN BURN/OPEN DETONATION UNIT
TOOELE VALLEY, UTAH

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Soils Sampling

II. Primary Hazards: Potential hazards associated with this task: contact with site contaminants; transfer of contamination; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect/animal bites and stings, poisonous plants, inclement weather.

III. Field Crew: _____

IV. On-site Inspection conducted Yes No Initials of Inspector TtNUS
Equipment Inspection required Yes No Initials of Inspector TtNUS

V. Protective equipment required

Level D Level B
 Level C Level A

Respiratory equipment required

Yes Specify on the reverse
 No

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
<u>Metals, Energetics, Dioxins/. Furans, Perchlorate, UXO</u>	<u>FID/PID (precautionary)</u>	<u>Any elevated reading above background</u>	<u>Evacuate area - contact the SSO</u>
_____	<u>Visual observation of airborne dusts in work areas.</u>	<u>If visible dusts are present use area wetting methods / dust suppression</u>	<u>Evacuate area until no visible dusts exist</u>
_____	_____	_____	_____

Primary Route(s) of Exposure/Hazard: Contact and incidental ingestions as a result of hand to mouth activities. Airborne dusts that may present an inhalation hazard are unlikely to be generated during planned site activities.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Hearing Protection (Plugs/Muffs)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Safety Belt/Harness	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Chemical/Splash Goggles.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Radio/Cellular Phone	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Shield	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Barricades.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Splash Suits/Coveralls	<input type="checkbox"/> Yes <input type="checkbox"/> No	Gloves (Type – Nitrile)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Impermeable Apron	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Work/rest regimen.....	<input type="checkbox"/> Yes <input type="checkbox"/> No
Steel Toe Work Shoes or Boots.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Chemical Resistant Boot Covers	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
High Visibility Vest	<input type="checkbox"/> Yes <input type="checkbox"/> No	Tape/Insect Repellent	<input type="checkbox"/> Yes <input type="checkbox"/> No
First Aid Kit.....	<input type="checkbox"/> Yes <input type="checkbox"/> No	Fire Extinguisher	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shower/Eyewash	<input type="checkbox"/> Yes <input type="checkbox"/> No	Other.....	<input type="checkbox"/> Yes <input type="checkbox"/> No

Modifications/Exceptions: _____

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Identified and Isolated (Splash and containment barriers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IX. Additional Permits required (Hot work, confined space entry, excavation etc.)..... Yes No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Any sustained readings in worker breathing zones will suggest an unanticipated condition that will require that site activities be suspended until the source of elevated readings is determined. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination.

Permit Issued by: _____ Permit Accepted by: _____