US Army
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Support Center
Huntsville, AL

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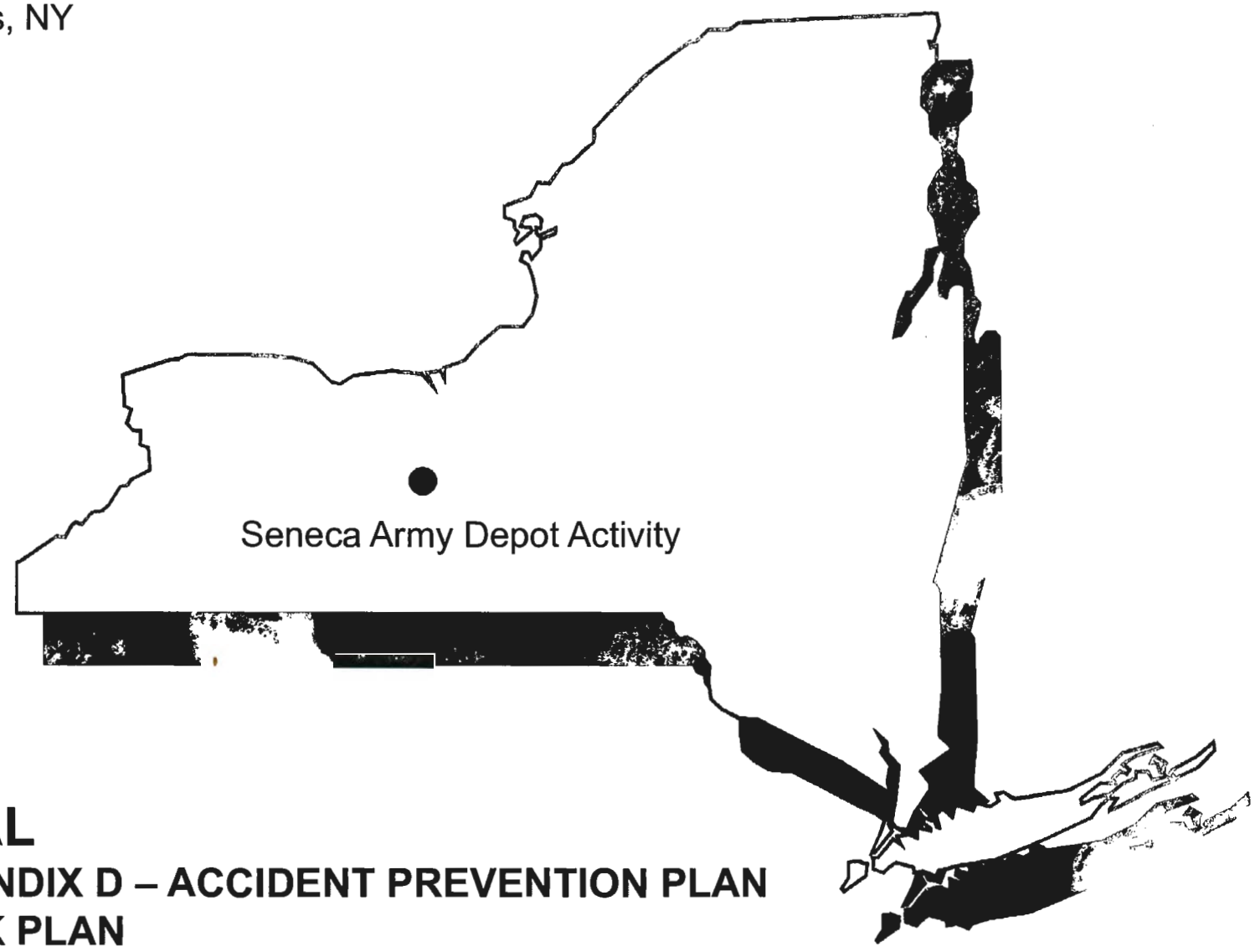
Seneca Army Depot Activity
Romulus, NY



FINAL

APPENDIX D – ACCIDENT PREVENTION PLAN WORK PLAN

MUNITIONS RESPONSE ACTION
OPEN DETONATION GROUNDS
SENECA ARMY DEPOT ACTIVITY

Contract No. W912DY-08-D-0003
Task Order No. 0013
EPA Site ID# NY0213820830
NY Site ID# 8-50-006

PARSONS

MARCH 2012

ACCIDENT PREVENTION PLAN
MUNITIONS RESPONSE ACTION OPEN DETONATION GROUNDS
SENECA ARMY DEPOT ACTIVITY

FINAL

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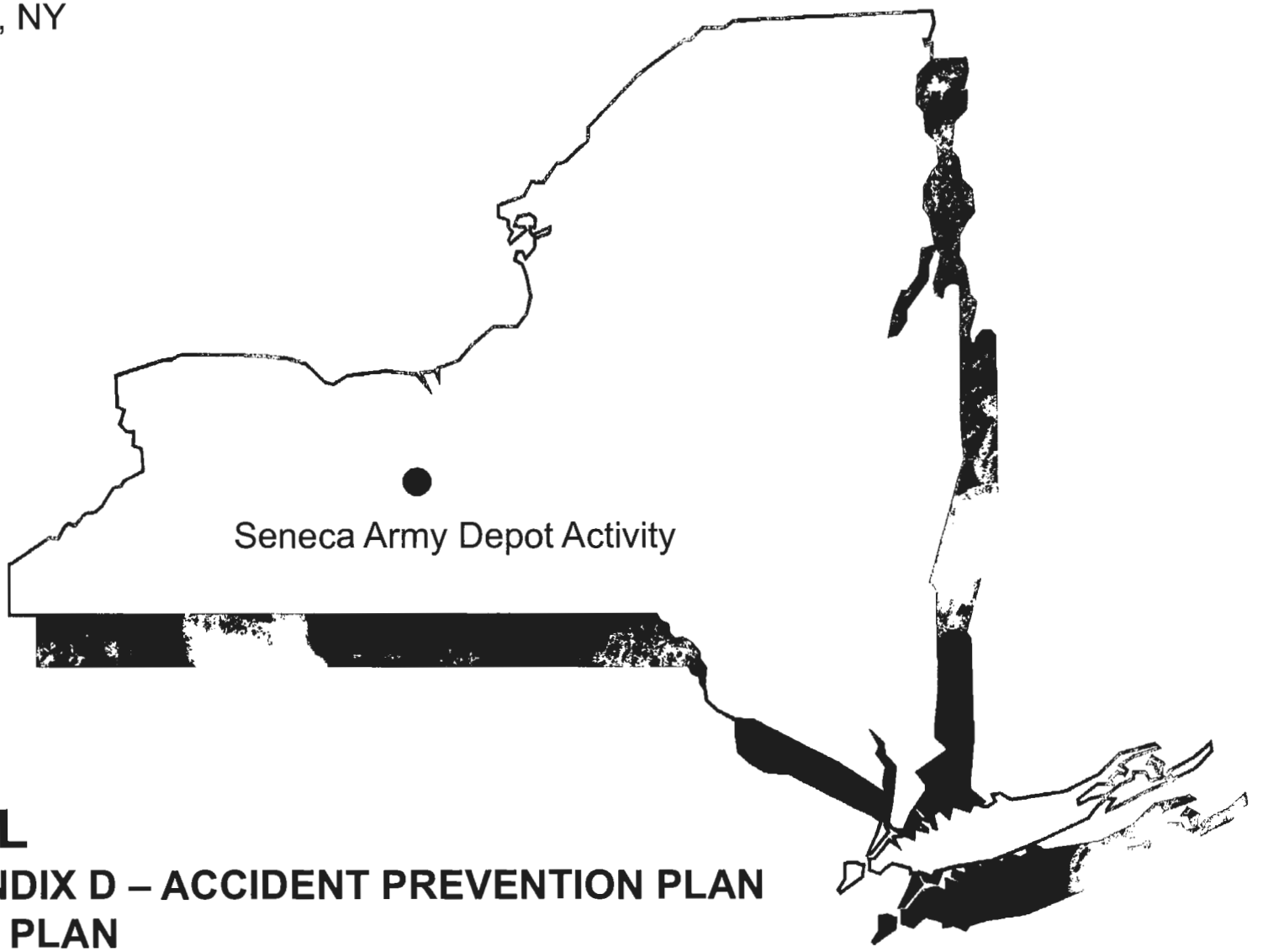

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PARSONS

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FINAL

APPENDIX D
ACCIDENT PREVENTION PLAN

SENECA ARMY DEPOT ACTIVITY (SEDA) OPEN DETONATION GROUNDS MUNITIONS RESPONSE ACTION
at
ROMULUS, NEW YORK

Prepared for:

U.S. Army Engineering and Support Center, Huntsville

Contract No. W912DY-08-D-003,
Task Order 13

Prepared by:

PARSONS
100 High Street,
Boston, Massachusetts

Revision 3
March 2012

Plan Preparation		
Tim Mustard, C.I.H. 303-564-3537 Parsons Deputy SH&E Director	Timothy S. Mustard, CIH	March 2012
Plan Approval		
John Lynch, P.E. 678-969-2492 Parsons Corporate Vice President	John W. Lynch	March 2012
Plan Concurrence		
Todd Heino 617-449-1405 Program Manager		March 2012

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CHAPTER 1
BACKGROUND INFORMATION

1.1. INTRODUCTION

1.1.1 Accident prevention is a key program element to achieve compliance and strive towards our ultimate goal of zero safety incidents. Personnel active in site operations will be thoroughly familiar with the programs and procedures outlined in this Accident Prevention Plan (APP) prior to conducting work at the site.

1.1.2 This program is intended to enable Parsons to provide services to the U.S. Army necessary to meet all applicable State and Federal requirements of Environmental laws and regulations for all phases of the Resource Conservation and Recovery Act (RCRA) (including Hazardous and Solid Waste Amendments of 1984); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (including Superfund Amendments and Reauthorization Act (SARA) of 1986); National Environmental Policy Act (NEPA); Clean Water Act; Clean Air Act and Clean Air Act Amendments; Toxic Substances Control Act (TSCA); and the Safe Drinking Water Act. The required services are applicable to Seneca Army Depot Activity (SEDA), various active Defense Logistics Agency (DLA) installations, and miscellaneous efforts as required under the Environmental Program.

1.1.3 Work undertaken under the identified contract vehicles is performed on a task or delivery order basis. Each delivery order has individual requirements and goals. Individual tasks may consist of only office type work (e.g., report or document preparation, preparation and presentation of investigation summaries, etc.), performance of field surveys, investigations or studies (e.g., site inspections, periodic groundwater monitoring, well abandonment, etc.) or combinations of both office type and field activities. Individual delivery order assignments may also involve work of Parsons personnel from the Boston and other offices, work requiring the collaboration of Parsons personnel and Army designated co-contractors, work requiring Parsons personnel and Parsons retained subcontractors, or any combination of the above. Requirements of this APP and Parsons overall Programmatic HAS Program are applicable to employees and subcontractors of Parsons.

1.2. PROJECT AUTHORIZATION AND DESCRIPTION

1.2.1 This Accident Prevention Plan (APP) was prepared in support of work being conducted by Parsons Infrastructure & Technology Group Inc. (Parsons) at the Seneca Army Depot Activity (SEDA or the Depot) in Romulus, New York under Contract W912DY-08-D-003 with the U.S. Army Engineering and Support Center, Huntsville (USAESCH) for Environmental Services principally for SEDA, DLA Installations in the State of New York and Facility Reduction Program Support Contract.

1.2.2 This APP has been prepared in accordance with requirements identified in, and guidance provided within U.S. Army Engineering Manual EM 385-1-1 " Safety and Health Requirements Manual," Appendix A "Minimum Basic Outline for Accident Prevention Plan" dated September 15, 2008. Additional guidance was obtained from Parsons Safety, Health, and Risk Program (SHARP) and by the Occupational Safety and Health Administration (OSHA) under Title 29 Code of Federal Regulations (29CFR) Parts 1910.120 and 1926.126. Required corporate- and project-specific information is presented in the main portion of the Site Health and Safety Plan (HASP), refer to Appendix A, while the more traditional information associated with a site-specific or task-specific hazardous waste operations (HAZWOPER) safety plan can be found in the Accident Prevention Plan and Generic Site Wide Health and Safety Plan for Seneca Army Depot Activity (Parsons, March 2005). The location of the Open Detonation (OD) Grounds at SEDA is presented in Figure 1-2 of the work plan.

1.3. PARSONS ACCIDENT EXPERIENCE

Parsons has a policy of compliance with all governing safety standards and regulations, and a safety performance goal of zero accidents, operational mishaps, and injuries/illnesses. As of January 1, 2011, Parsons' Experience Modification Rate (EMR) is 0.58.

1.4. HAZARDOUS ACTIVITIES ASSOCIATED WITH THE INVESTIGATION ACTIVITIES AT THE SEDA OPEN DETONATION HILL

1.4.1 The major stages of the MEC/MD investigation include site preparation and brush clearing, DGM and excavation of anomalies. Similarly, if MEC is encountered during the surface debris removal, surface clearance, excavation of anomalies, etc., the protocol for identifying, handling, and disposing of the item will be implemented.

1.4.2 Surface debris removal and/or surface clearance will be conducted in addition to DGM surveys to locate potential metallic (MEC/MD) anomalies. Anomalies will be intrusively investigated and identified in accordance with the work plan. Any MEC recovered during this effort will be dealt with in accordance with the work plan.

1.4.3 The work will involve potentially hazardous activities during the course of operations. Chapter 2 of the Site Safety and Health Plan (SSHP) and Attachment 1 to this APP identifies the hazards associated with the project activities. The Activity Hazard Analyses (AHA) for these activities are presented in Attachment 2 to this APP and details each activity to be performed during the project and the associated preventative measures for avoiding accidents. Personnel involved with hazardous tasks will be qualified to participate by previous or site-specific training, as applicable.

CHAPTER 2
STATEMENT OF SAFETY AND HEALTH POLICY

2.1. PARSONS CORPORATE SAFETY AND HEALTH POLICY STATEMENT

2.1.1 As an industry-leading engineering, construction, and technical services firm, Parsons is firmly committed to maintaining a safe and healthy working environment at all its offices and project facilities. We share the National Safety Council Safety and Health Code of Ethics as the principles guiding our commitment to safety.

1. We will hold safety and health as our highest core value.

2. Executive management will lead the safety improvement process.

3. Safety will be a responsibility shared by everyone in our organization.

4. Safety performance will be a key indicator of our organizational excellence and will be incorporated into our business processes.

5. We will communicate safety performance openly with employees.

6. All employees will be given the knowledge and skills necessary to safely perform their jobs.

7. We will extend our safety efforts beyond the workplace to include transportation, homes, and communities.

8. We will continually strive to improve our safety and health processes.

2.1.2 To meet its health and safety objectives, all Parsons employees are expected to act proactively with regard to health and safety issues. This requires the combined efforts of a concerned management, responsible and knowledgeable supervision, and conscientious, well-trained employees.

2.1.3 Parsons will take all reasonable action to meet or exceed the applicable occupational health and safety requirements, domestically and internationally, and will continuously monitor and improve operations, procedures, technologies, and programs that are conducive to maintaining a safe and healthy working environment.

Table D-2.1
Zero Incidents Techniques: A Snapshot of What and Why

Key Technique		What and Why
		Pre-task planning improves productivity and reduces the negative impact of direct and indirect costs of accidents.
	Safety Training and Education	Orientations, daily and weekly training sessions are conducted at all levels of an organization. Specialized training is also conducted to provide specific knowledge about hazardous work activities. Ongoing safety orientation and training gives employees the knowledge and skills to complete their job tasks without injury.
	Worker Involvement and Participation	Empowering employees to identify hazards in the workplace is a valuable tool to increase safety awareness. Conducting labor-management safety committee meetings allows a forum to coordinate and resolve safety issues. When employees identify and have the ability to correct hazards in the workplace, safety motivation and awareness increase and fewer accidents occur.
	Recognition and Rewards	Employee recognition programs to reward and recognize employees for safe behavior can be based on individual or group accomplishments. Safe behavior is positively reinforced through management involvement, personal contact, communication, and training.
	Subcontractor Management	Project Managers must ensure subcontractors comply with safety and health rules and regulations in accordance with contractual requirements. Aggressive management of subcontractor safety reduces accidents and incidents on the jobsite and reduces the risk of general liability claims against the company.
	Accident/Incident Reporting and Investigation	Each project must investigate accidents and incidents immediately and report to the appropriate GBU personnel. The investigation process includes root cause determination and recommendations to prevent future occurrences.
	Drug and Alcohol Testing	Employees are tested for drugs and alcohol where and when permitted by state law and local collective bargaining agreements during pre-employment, at random, post-accident, and when reasonable suspicion exists. Testing employees for drugs and alcohol reduces the likelihood of serious injuries as a result of workers being impaired while working on a project.

2.2. PARSONS SAFETY, HEALTH, AND RISK PROGRAM

2.2.1 Parsons has developed a Safety, Health, and Risk Program (SHARP) for the implementation of key safety initiatives on all Parsons' projects. All Parsons PMs maintain a copy of this document in their office to ensure application and conformance on all projects. SHARP Management formalizes our corporate Zero Incident management approach. The Zero Incident philosophy originated with a study by the Construction Industry Institute (CII) that identified specific control measures shown to dramatically reduce the probability of incidents. The control measures known as Zero Incident Techniques provide the framework for SHARP Management. SHARP Management is Parsons' proactive approach to manage the three interrelated areas of safety, health, and risk management.

2.2.2 To ensure the success of SHARP Management, Parsons' safety culture must be dynamic and evolving. This begins with training all management personnel in the foundations and philosophy of SHARP Management through Supervisory Training in Accident Reduction Techniques, known as the START program. This training lays the groundwork for SHARP Management by creating accountability and responsibility for the safety and risk process with all employees. All Parsons Supervisors must complete START training.

2.2.3 SHARP Management is based on nine Zero Incident Techniques, each essential to the success of our project safety programs. Details of the Zero Incident Techniques are provided in Table D-2.1. These techniques establish the distinct Parsons Safety culture by standardizing our safety, health, and risk program and empowering every employee to take action to eliminate injury and enhance safety.

Table D-2.1
Zero Incidents Techniques: A Snapshot of What and Why

	Key Technique	What and Why
	Demonstrated Management Commitment	All levels of management consistently display their commitment to the SHARP Management process. As organization leaders, managers are role models whose actions send a strong message to employees.
	Staffing for Safety	Each GBU funds a full-time Safety Manager to assist in implementing and administering Parsons' safety program and SHARP Management. The safety manager consults with line organizations, helping to emphasize that safety is the responsibility of each employee on the project, not just the safety department.
	Safety Planning -- Pre-project/Pre-task	Planning safety into design and construction by using activity hazards analyses is key to eliminating accidents and incidents in the workplace. Planning job tasks with safety as a key component raises safety awareness of supervisors and employees.

CHAPTER 3
RESPONSIBILITIES AND LINES OF AUTHORITY

3.1. LEVELS OF SAFETY RESPONSIBILITY AT PARSONS

3.1.1. Parsons Corporate Safety Personnel

Parsons corporate safety personnel are required to develop, communicate, and oversee Parsons' health and safety programs at all Parsons business units. These employees will assist Parsons business unit managers regarding health and safety regulations, reporting requirements, safety training, and other related issues. Corporate safety personnel are responsible for monitoring the effectiveness of Parsons' health and safety programs, conducting audits, ensuring that all injuries and near misses are fully investigated, and developing Occupational Safety and Health Administration (OSHA) reporting and worker's compensation claim procedures. As part of corporate policy, safety information and statistics will be collected and maintained for all Parsons business units. Parsons corporate safety personnel also keep senior management informed of significant internal and external developments regarding health and safety.

3.1.2. Parsons Management and Supervisory Personnel

Supervisors and members of management, at all levels within Parsons, will comply with the Company's Health and Safety Policy and ensure that the applicable health and safety requirements at each domestic and international office and project facility are effectively implemented and monitored at all times. The supervisors and members of management will insure that the policies are effectively integrated with the preparation of proposals, project planning, and project execution. The safety performance of subcontractors will also be monitored in accordance with contract specifications as required by the contract with the client. Safety information and statistics will be reported to Parsons Corporate Safety Manager by personnel serving as supervisors or managers on a consistent and regular basis.

3.1.3. Parsons Employee Responsibility

Health and safety is the responsibility of everyone at Parsons. The Parsons employee, to include subcontractors of Parsons, is required to exercise maximum appropriate care and good judgment at all times regarding health and safety, and adhere to safety procedures to prevent accidents and injuries. Any accidents or injuries either suffered by or witnessed by employees will be promptly reported to supervisory personnel. In order to better plan and avoid possible future accidents or injuries, the Parsons employee is required to promptly report any near misses or close calls. The employees are also required to promptly report any unsafe conditions, equipment, or practices to supervisory personnel in order to ensure a safe working environment.

At the project level, the Project Manager, the Site Manager (SM), the Site Safety and Health Officer (SSHO), and/or the UXO Safety Officer (UXOSO) all have responsibilities for safety as set out in Chapter 2 of the work plan.

3.2. LINES OF AUTHORITY REGARDING SAFETY

It is important for each employee involved with the project to know and understand the lines of authority. The organizational structure of supervisory personnel for this project is outlined in Chapter 2, Technical Management Plan, of this work plan. All personnel will be informed of this organizational structure during the training phase of the project. A copy of the project organization chart will be posted on the jobsite in order to provide quick references to anyone needing to report or make suggestions regarding safety issues. The resumes of key safety personnel in the organizational structure are provided in Appendix H of the work plan.

CHAPTER 4
SUBCONTRACTORS AND SUPPLIERS

4.1. IDENTIFICATION OF SUBCONTRACTORS AND SUPPLIERS

Table D-4.1 details the current vendors and subcontractors anticipated to supply equipment or render services to the personnel working at the remedial munitions response actions project at SEDA in Romulus, NY. The actual subcontractors and suppliers used may vary from the list in Table D-4.1. All services and vendors will be selected based on government-approved procurement procedures.

Table D-4.1
Subcontractors and Suppliers

Subcontractor or Supplier	Service Provided
Ordnance and Explosives Remediation (OER) 135 King Street, Suite 400 Cohasset, MA 02025 (781)-383-8339	UXO Services
Sessler 1257 State Route 96 N Waterloo, NY 13165 (315)-539-3353	Brush Clearing
Demil Metals, Inc. PO Box 126 Glencoe, IL 60022 (846)-266-0119	Metals, Transport, Smelting and Recycling

4.2. SUBCONTRACTOR CONTROL AND SAFETY RESPONSIBILITIES

Each subcontractor is required to abide by all site safety and health regulations. Parsons will work closely with each subcontractor to ensure they are aware of the health and safety regulations that apply to the work site. Personnel arriving on-site to conduct business or provide a service will first attend an initial site-specific safety briefing. If returning to the site, the individual will be required to register and sign in at the office before beginning work. The site-specific safety briefing will inform the individual of the policies and regulations that apply to the subcontractor while on-site. The briefing will also include hazards associated with the individual's area of work, as well as hazards specific to the site. Documentation of the subcontractor's attendance will be generated and the personnel involved will agree to abide by

all site regulations. The policy and procedures identified for subcontractors and suppliers in Section 5 of the *Accident Prevention Plan and Generic Site Wide Health and Safety Plan for Seneca Army Depot Activity* (Parsons, March 2005) will also be implements as part of this APP.

CHAPTER 5
TRAINING

5.1. GENERAL

5.1.1 Table D-5.1 lists the training requirements for various project personnel. Site personnel are grouped into categories of supervisors, field teams, visitors and authorized entrants. With respect to training requirements, the supervisors are the SM and the SSHO/UXO Safety Officer (UXOSO). At least two members of the field team will also be certified in first aid/CPR. Visitors are those workers such as deliverymen, repairmen, or subcontractors, who will not enter the active Exclusion Zone (EZ) and who will be escorted during their time on-site. The required training is shown in Table D-5.1; however, additional training may be required at the discretion of the SSHO.

5.1.2 The training requirements identified in Section 6 of the *Accident Prevention Plan And Generic Site Wide Health and Safety Plan for Seneca Army Depot Activity* (Parsons March 2005) will also be implemented as part of this APP.

5.2. INITIAL TRAINING

5.2.1 Prior to arriving on-site, all personnel will receive training from their employers complying with, but not necessarily limited to, those requirements specified by the USACE in EM 385-1-1, EM 385-1-97, 29 CFR §1910.120 (Hazardous Waste Operations and Emergency Response [HAZWOPER]), 29 CFR §1910.1200 (Hazard Communication), and 29 CFR §1910.1030 (bloodborne pathogens). Copies of certificates of completion, for HAZWOPER training (initial 40-hour and refresher course, supervisor training, etc.), medical status, first aid, and cardiopulmonary resuscitation (CPR), and contracting officer review of the Parsons certification of key personnel working on-site will be maintained on-site by the SSHO. These requirements are summarized in Table D-5.1

5.2.2 In addition to the initial training above, site-specific training, including topics on safe work practices and equipment use (including heavy equipment), PPE, medical surveillance, and emergency response, will be conducted upon mobilization (refer to paragraph 5.5 of this APP).

5.2.3 Personnel conducting brush clearing, surveying, or other similar non-intrusive activities are not subject to HAZWOPER training requirements under the following conditions:

- No intrusive operations occur while those personnel are conducting brush clearance;
- There is no potential for those personnel to be exposed to hazardous contaminants;

- The personnel receive the daily/visitor's site safety briefing prior to commencing work; and
- A UXO escort is provided for entrance into areas that have not been cleared of potential MEC.

Table D-5.1
Training Requirements

Training Content	Duration (If specified)	Frequency (If specified)	Personnel Categories (see Section 5.0)		
			Supervisors (UXOSO, SM)	Field Teams	Visitors
Health and Safety for Hazardous Waste Operations and Emergency Response – 29 CFR 1910.120	40-Hours	Once	☑	☑	
Health and Safety for Hazardous Waste Operations and Emergency Response (Refresher) - 29 CFR 1910.120	8-Hours	Annually	☑	☑	
Supervised Field Experience	3-Days	Once	☑	☑	
Supervisor's Health and Safety for Hazardous Waste Operations and Emergency Response – 29 CFR 1910.120	8-Hours	Once	☑		
Construction Safety Training (to comply with EM 385-1-1 01.A.17.b)	30-Hours	Once	☑[1]		
Site-Specific Training (see Section 5.5 for training contents)	-	Once	☑	☑	
Hazard Communication, Hazards of Materials Used/Encountered	-	Once	☑	☑	
First Aid and CPR (Minimum of 2 Trained Personnel On Site) - Equivalent to American Red Cross Training	-	Every 3 yrs for First Aid; every year for CPR	☑[2]	☑[2]	
Bloodborne Pathogen – 29 CFR 1915.1030 Protective Equipment, Containment and Disposal of Waste	-	Annually	☑	☑	
Visitor Training - Operational Activities & Hazards, Boundaries of Work Area and Entry/Exit, Emergency Evacuation & Assembly Points, PPE	-	Per visit			☑
Tailgate Safety Meetings - Potential Hazards & Risks, Encounters with Hazardous Materials to Date, Daily Activities	-	Daily, prior to operations	☑	☑	☑

1 SSHO is the only person required to have this training.
2 A minimum of 2 trained personnel on site. Any of the personnel categories may have workers trained in First Aid/CPR.

5.3. SUPERVISORY TRAINING

The SSHO and individuals responsible for supervising personnel engaged in site work will also have at least eight additional hours of specialized training on managing such operations. This specialized training includes the employer's safety and health program and the associated employee training program, PPE program, and health hazard monitoring procedures and techniques. These supervisory personnel will also each have a minimum of three days of field experience under the supervision of a trained, experienced supervisor.

5.4. REFRESHER TRAINING

All applicable site personnel will complete eight hours of HAZWOPER refresher training annually on the items covered in the 40-hour initial training program.

5.5. SITE-SPECIFIC TRAINING

5.5.1 Site-specific training will be provided for all personnel, contractors, and subcontractors who plan to work on-site and have met the requirements of Section 5.1. Training will be conducted prior to the job start-up, or for new or replacement personnel prior to starting work, and as needed thereafter. The SSHO will conduct initial site-specific training prior to job start-up to ensure that personnel have a thorough understanding of the APP/SSHP, the overall project, standard operating procedures (SOPs), and all of the potential safety hazards at the site. The site-specific training will be conducted as necessary when new personnel enter the site. The topics covered in the site-specific health and safety training will include:

- Site history and background;
- Names of key personnel and their responsibilities;
- Project goals and objectives;
- Employee rights and responsibilities under OSHA;
- Review of the work plan/APP/SSHP and AHAs;
- SOPs prepared specifically for various aspects of this project;
- Site control measures;
- Fire prevention measures;
- Emergency response procedures;
- Locations of medical facilities/hospitals;
- Medical surveillance program;
- PPE;
- Discussion of action levels for changing site PPE or evacuating the site;
- Heat and/or cold stress prevention, treatment, and monitoring;

- Biological hazards including snakes, plants, and insect-borne disease;
- Other physical hazards such as slips, trips, and falls, noise, electrocution, being struck by something and being caught in or between something;
- Proper lifting techniques;
- Personal cleanliness and restrictions on eating, drinking, and smoking; and,
- Site-specific UXO recognition training to include demolition training.

5.5.2 Personnel will also be instructed in the use of the "buddy system", which is a method of organizing work groups so that there is someone that is always available to:

- Provide their partner with assistance in an emergency;
- Observe their partner for signs of chemical or physical exposure;
- Periodically check the integrity of their partner's PPE; and
- Notify the emergency response personnel when an emergency occurs.

5.5.3 Any emergency response training during a project will be conducted by the SSHO. The qualifications are relative to the specific emergency response operation being conducted and are outlined in EM 385-1-1.

5.5.4 All personnel will be made aware of the most probable route of evacuation from the site in the event of an emergency and other emergency procedures included in the project plans. All personnel will be briefed on the procedures and hazards specific to the site.

5.5.5 At the completion of site-specific training, all personnel will be required to sign forms that state they have received site-specific training, and read, understood, agreed with, and will abide by the health and safety procedures outlined in the APP. Appendix F, Contractor Forms, of the work plan contains a Plan Acceptance Form and the Site-Specific Training Form.

5.5.6 Parsons also encourages the use of "Take 5 for Safety" program for all field activities prior to commencement of each new task.

PARSONS	Safety-The first thing you do!

Date _____

Project/Task _____

Your Name _____

Before you begin any new task pause for 30 seconds and ask yourself the following questions. Take corrective actions as necessary prior to beginning work.

- ☐ Do I know exactly what I am doing?
- ☐ Have I reviewed the AHA for this task?
- ☐ Do I have all the right people involved?
- ☐ Is there any potential that I or my coworkers could get hurt?
- ☐ Are there any questions I should be asking fellow employees?
- ☐ Should I talk to my supervisor?
- ☐ Have I read the work plan and fully understand the procedures relating to this job?
- ☐ Am I using the proper tools?
- ☐ Do I have the proper PPE?
- ☐ Will I be working as safely as I know how?
- ☐ Do I see anything that just doesn't look quite right?
- ☐ Am I in a hurry? Would I be safer if I slowed down?

Eachof these questions should be answered to your full satisfaction before you proceed with the work. Remember, no job is so important that you must jeopardize your safety.

Job Hazards? (List direct hazard of job duties)

1. Hazards:

Mitigation _____

2. Hazards:

Mitigation _____

3. Hazards:

Mitigation _____

Work Area	Yes	No
Permits Attained	☐	☐
Work Area Clean	☐	☐
Standard PPE *(Hard hat, vest, glasses, gloves, safety boots)*	☐	☐

Additional PPE needed:_____

Briefly review hazards and mitigations again after lunch.

5.6. SAFETY MEETINGS

5.6.1. Daily Tailgate Meetings

All personnel who plan to enter the site during investigation activities will attend the daily safety meeting. This meeting, conducted by the SSHO, will cover specific health and safety issues, site activities for that day, changes in site conditions, topics covered in the initial health and safety meeting as they apply to daily activities, PPE, personnel and equipment, potential physical hazards, emergency warning signal, rally point, etc. Issues discussed in the daily tailgate meeting will be documented on a form, which will be signed by all the attendees and retained by the SSHO. A sample Daily Safety Briefing Attendance Form is provided in Appendix F of the work plan.

5.6.2. Site Safety Committee Meetings

During weekly progress meetings, the SM, SSHO, and subcontractor on-site safety managers (Site Safety Committee) will review and summarize upcoming work tasks, audits and inspections, competent personnel changes, and training. The Site Safety Committee will discuss and evaluate the risks of the upcoming work tasks and the planned mitigation measures for follow-on discussion during the daily tailgate safety meetings. Activities will be added to the summary at least two weeks in advance of the work. The Risk Mitigation Two-Week Look-Ahead Form, provided in Appendix F of this work plan, can be used to plan risk mitigation strategies at the weekly progress meetings.

5.7. FIRST AID/CPR AND BLOODBORNE PATHOGENS TRAINING

5.7.1. First Aid/CPR

Personnel assigned to conduct fieldwork for this project will not conduct first aid or CPR as a primary job function. Rather, selected employees have been trained in CPR and first aid for emergency use only. Acting in the capacity of a designated emergency first aid provider is not mandatory, and anyone who is uncomfortable with the possibility of being so designated should notify the SSHO. In accordance with EM 385-1-1, at least two individuals currently certified in CPR and first aid shall be present on-site at all times during site operations.

5.7.2. Bloodborne Pathogens

5.7.2.1 An indoctrination to the bloodborne pathogens standard (29 CFR 1910.1030) will be provided to employees either during their first aid training and/or during the initial site health and safety meeting. Hepatitis B and Acquired Immune Deficiency Syndrome (AIDS), among other pathogenic microorganisms, can be contracted due to emergency first aid and CPR through contact with blood. Therefore, it is important to recognize the concept of "universal precautions". Universal precautions require one to assume that all blood and bodily fluids contain pathogens and require the use of protective barriers to prevent exposure. Latex gloves and CPR barriers will be available in the first aid supplies stored at each site and should be used prior to attending to a victim's needs. Additionally, washing any body part or surface that has

been contaminated with blood is an important part of the universal precautions. The SSHO should be notified of any potential contact with blood or bodily fluids resulting from first aid or CPR administered on the job.

5.7.2.2 Hepatitis B Vaccine - Should personnel trained in first aid and CPR desire the vaccine, Parsons will arrange to have the individual receive the series of inoculations. The Hepatitis B vaccine can also be effective when administered after exposure to blood containing the Hepatitis B virus, though this method is less efficient than vaccination.

5.8. EMERGENCY RESPONSE TRAINING

All personnel will be made aware of the project emergency assistance network, the most probable route of evacuation from the site in the event of emergency, and other emergency procedures included in Chapter 16 of the SSHP (Attachment 1 of this APP).

5.9. HAZARD COMMUNICATION TRAINING

5.9.1 In accordance with the OSHA Hazard Communication Standard (29 CFR 1920.1200 and CFR 1926.59), copies of all material safety data sheets (MSDS) for hazardous chemical materials that are planned for use during site operations or that are present on-site will be available on-site from the SSHO. Additionally, SOP 9 - Hazard Communication Program, is provided in Attachment 3 of this APP and will be maintained at the site by the SSHO.

5.9.2 Hazard communication training in accordance with 29 CFR 1920.1200 and CFR 1926.59, DA PAM 40-173, DA PAM 385-61, and EM 385-1-1 will be presented during site-specific training to address site-specific hazards. Training will include, but not be limited to all hazards or potential hazards associated with site activities and any hazardous chemical materials brought to or found on-site. MSDSs for chemicals potentially present will be maintained on-site by the SSHO.

5.10. VISITOR TRAINING

5.10.1 All visitors or authorized entrants to the site will check in with the SSHO. Site visitors are anyone coming to the site for short-term activities and an authorized entrant is anyone entering the site that is assigned to the site but not a site worker (e.g., security forces, other military forces). Site visitors or authorized entrants will check in with the SSHO and receive a visitor's safety briefing that will include the following:

- Location and description of potential hazards and risks;
- Emergency warning alarms, evacuation procedures, and location of rally point;
- Chemical and physical hazards found on-site;
- Areas of the site that are closed to visitors/authorized entrants; and
- Other topics as deemed appropriate.

5.10.2 All visitors/authorized entrants will be required to sign the Visitor's Log. Site visitors/authorized entrants wishing to enter the work area during site operations will be subject to the same documentation and training as specified for site workers.

5.11. UXO TRAINING

5.11.1. Non-UXO Personnel

All non-UXO trained site personnel will be trained in UXO recognition, hazards, and actions to take in the event that a suspected UXO item is encountered.

5.11.2. UXO Personnel

All UXO trained personnel, regardless of position, will receive site-specific UXO training and demolition training.

5.12. TRAINING DOCUMENTATION

Documentation of training requirements is the responsibility of Parsons and the subcontractors. Written documentation verifying compliance with 29 CFR 1910.120 (e)(3), (e)(4) (as applicable), and (e)(8) will be submitted to the SSHO prior to commencing work at the site. Types of training documentation include 40-hr HAZWOPER, 8-hr HAZWOPER refresher, 8-hour supervisor training, 30-hr OSHA construction safety, UXO, bloodborne pathogens, HAZCOM, first aid, CPR, current physician's certificate, and hearing conservation training. Documentation of all workers' current training credentials will be kept on-site. Daily tailgate meetings will be documented using the form presented in Appendix F of the work plan.

CHAPTER 6
SAFETY AND HEALTH INSPECTIONS

6.1. RESPONSIBILITY

6.1.1 As part of the Parsons SHARP Management, roles and responsibilities for safety audits, inspections, and recordkeeping have been established. For each project, the Parsons PM is responsible for ensuring that routine internal safety inspections are performed, tracking corrective actions to completion, and performing inspections. The Parsons SSHO is responsible for developing and implementing the project safety and health inspection program contained in this plan as well as conducting inspections.

6.1.2 The SSHO is responsible for conducting safety and health inspections or 'walkarounds', identifying and reporting deficiencies, and working with the project team to develop corrections. The SSHO will follow-up on any deficiency in a timely manner and halt operations, if necessary, in order to ensure that individuals are not exposed to an unsafe environment.

6.2. INSPECTIONS

6.2.1 Safety and health inspections will be conducted either by the SSHO (Mr. Ben McAllister), the PSHO (Mr. Tim Mustard), the Parsons PM (Mr. Todd Heino), the UXOQCS (Mr. Richard Endress), or a qualified appointee. Personnel responsible for safety and health inspections will meet the criteria of an OSHA competent person. Personnel rèsumès and qualifications are provided in Appendix H to this work plan. An OSHA competent person is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them" The SSHO, PSHO and SM meet this requirement. Safety and health inspections will be conducted at least weekly during field operations or when any of the following events occur:

- The introduction of new substances, procedures, or equipment that presents potential new hazards into the workplace;
- New, previously unidentified hazards are recognized;
- Receipt of complaints of unsafe conditions; or
- In the event of an occupational injury or illness.

6.2.2 Safety inspections are conducted by physically walking around the work area(s) and observing conditions for routine and emergency access, evacuation technique, PPE, work practices, site access control, first aid equipment, firefighting equipment, and sanitation. The

inspections may include conversations with workers and supervisors and review of certifications and training documentation.

6.2.3 All deficiencies or nonconformances will be documented. If safety hazards exist, it may be necessary to stop work until corrections are in place. Many deficiencies can be corrected immediately by placing barriers, installing signs, changing procedures, etc. The status of each deficiency will be tracked by the SSHO to ensure that a correction is made. If necessary, the SSHO will stop work until the deficiency is corrected. Follow-up reporting on deficiencies will be included on succeeding safety and health inspection documentation until the deficiency is resolved.

6.3. RECORDKEEPING

A record of each inspection will be maintained in the project files. The record must include the name of the inspector, unsafe conditions and work practices identified, and actions taken to correct unsafe conditions and work practices. A standard safety inspection form has been developed to assist the inspections and provide documentation of safety and health non-conformances. The Safety Inspection form is located in Appendix F of the work plan.

CHAPTER 7
SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE

7.1. SAFETY GOALS AND OBJECTIVES

As stated in the company's Corporate Safety and Health Policy Statement (Chapter 2 of this APP), Parsons holds safety and health as our highest core value. It is Parsons' objective to maintain a safe working environment and complete every job with zero accidents.

7.2. PARSONS SAFETY AWARD PROGRAM

7.2.1 Project management meets on a regular basis to maintain and support an incentive program for Parsons and subcontractor employees. The rewards and recognition program focuses on leading indicators rather than lagging indicators. Projects and programs are encouraged to reward their teams and individual employees with items from the Parsons Online Safety Products Store and are encouraged to base incentives on leading safety, health and environment (SH&E) indicators. This policy recognizes achievements or accomplishments that contribute to the overall SH&E objectives of the company. Employees will be encouraged to meet the following goals and will be rewarded accordingly:

- Lead daily morning tailgate briefings;
- Report two near misses during the project;
- Site Manager will also recognize an employee who best demonstrates safe practices and promotes a safety culture.

7.2.2 The reward for employees who satisfy these goals will be a gift certificate to the Parsons Online store.

7.3. SAFETY VIOLATIONS

7.3.1 In the event of a safety violation, the individual (supervisor, manager, employee) or company will be notified of the issue and the situation will be documented. After documentation is completed, the safety violator will be required to submit a written plan of action to correct the problem within two days of notification. Failure to comply will result in disciplinary action against the individual or the individual's company. If the violation is such that work on the site is deemed unsafe, work will be stopped until the problem is corrected and the SSHO inspects the site for safety. Once the corrections are in place and the site has been inspected for compliance, the SSHO will notify the SM when work may resume. Subcontractor Safety Violation and Noncompliance forms are provided in Appendix F of the work plan.

7.3.2 Each member of the project team will play a part in keeping operations safe. A brief description of each employee's safety responsibility is listed below:

- Senior management is responsible for leadership and support of the safety program, for its effectiveness and improvement, and for providing all the safe guards necessary to assure a safe working environment.
- Supervisors are responsible for developing proper attitudes towards safety in themselves, and in those they supervise. Supervisors must ensure that all operations are performed with the highest regard for the safety of all personnel involved.
- Employees are responsible for genuine cooperation with all aspects of the safety program, including compliance with all policies and procedures. Employees need to continually practice safety while performing their work duties.

7.3.3 Parsons holds the SM, SSHO, and PM accountable for maintaining project safety and health. All of these persons may be subject to safety inspections by Parsons senior management. These inspections are used to measure safety and health performance and to provide feedback.

CHAPTER 8
ACCIDENT REPORTING

8.1. EXPOSURE DATA

Exposure data will be submitted weekly via the Site Manager's last daily report for the week. This daily report will include:

- Number of personnel onsite for each organization;
- Number of hours worked for each person onsite;
- Number of miles driven for all vehicles onsite; and
- Number of accidents reported.

8.2. ACCIDENT INVESTIGATIONS, REPORTS, AND LOGS

8.2.1 Accident investigations are an important element of Parsons Safety Program because they provide useful information to prevent similar incidents. Incident investigations identify root causes, system failures, unsafe acts and conditions, and noncompliance with or inadequacy of the APP. All significant near miss, injury, illness, or major equipment or property damage incidents (including work interruptions) require an investigation.

8.2.2 The PM and SSHO must conduct the on-site investigation immediately and prepare an incident investigation report in the event that one is required. The PM is responsible for ensuring that all incidents are reported and investigated in a timely manner and that appropriate corrective actions are identified and implemented. The SSHO usually leads investigations with the assistance of the SM and SSHO.

8.2.3 The general information collected by the accident investigation includes:

- Location, time, and date;
- Description of the operation being performed at the time of the accident;
- Outline of the sequence of events that led up to the accident;
- All personnel associated with the work task and incident; and
- All eyewitnesses.

8.2.4 The investigation team will proceed in the following manner:

- Identify, secure, and document any evidence, tools, or other materials pertinent to the investigation.

- Identify and interview all involved employees and eyewitnesses.
- Provide a private place and time for each individual to prepare a written statement.
- Prepare and issue a written report.

8.3. ACCIDENT REPORTING

8.3.1 In the event an incident occurs at the site, the SSHO will investigate the incident after all emergency actions have been taken. Parsons' policy is that all incidents must be reported through the local supervisor and Project Manager to the Global Business Unit (GBU) Safety Manager within four hours of the initial incident. ENG Form 3394 (Appendix F of the work plan) will be filled out by the SSHO and submitted to the Parsons PSHM. A verbal notification should be given to the SSHO that the form is being filled out.

8.3.2 All incidents and accidents will be reported as soon as possible but not more than 24 hours afterwards to the contracting officer (as the government designated authority) and the remainder of the project team. The incident will be reported to the government designated authority immediately, and will also be reported to OSHA, if there is:

1. a fatal injury/illness;
2. a permanent total disability;
3. a permanent partial disability;
4. the hospitalization of three or more people resulting from a single occurrence;
5. property damage in the amount of $200,000 or more;
6. adverse attention or publicity to the USACE; or
7. three or more individuals become ill or have a medical condition which is suspected to related to a site condition. For Items 1 and 4, OSHA must also be related to a site condition, or a hazardous or toxic agent or notified within 8 hours of the site.

8.3.3 If possible, notification should go through the SSHO; however, it may be necessary to make the notification directly in order to meet the deadline. Parsons will submit the findings of the accident investigation along with appropriate corrective actions to the contracting officer as soon as possible but no later than five (5) working days following the accident. Corrective actions will be implemented as soon as reasonably possible.

8.3.4 Parsons has an online incident reporting tool for internal reporting. All incidents must be reported in the online incident reporting system within 4 hours. This system can be used to file the initial report and the incident detail report; however, it is necessary to have access to the Parsons PWeb in order to use this tool. The incident reporting tool can be accessed at the following link: https://pweb.parsons.com/PIT/safety/default.htm.

8.3.5 Other lost-time or OSHA recordable accidents will be formally reported (i.e., using a written report) to USAESCH within three working days. The onsite USAESCH representative will be verbally notified within one day of any accident or injury that may require reporting. An

OSHA 300 log of work-related injuries and illnesses will be maintained at the site. A copy of the OSHA 300 log is provided in Appendix F of this work plan.

CHAPTER 9
MEDICAL SUPPORT

9.1 The medical support requirements necessary during activities at the OD Grounds, Romulus, NY are described in the following sections.

9.2 During investigations at the OD Grounds, the SSHO is designated as the first responder for medical emergencies or minor injuries. At least two personnel trained in First Aid and CPR will be on-site at all times. The names and qualifications of the designated individuals will be provided to USACE prior to the beginning of field activities.

9.3 In the event of a medical emergency, team members will render first aid; while additional medical assistance will be requested by calling 911. See **Table D-9.1 for a list of Emergency Contacts**. Additional information regarding Emergency Response can be found in Chapter 16 of the SSHP, included as Attachment 1 of this APP.

9.4 The nearest **occupational clinic** is **Life Care Medical Associates (1991 Balsley Road, Seneca Falls, NY 13148, Main # 315-539-5229)**. The nearest **hospital** is **Geneva Hospital (196 North Street, Geneva, NY 14456, Main # 315-787-4000)**. Life threatening, medical emergencies, and after-hours at clinic will be sent to the hospital for treatment. Otherwise, a work related injury which is not a medical emergency; it is preferable that injured personnel go to the industrial clinic (e.g., Life Care Medical Associates). A map showing the transportation route to the hospital is shown in Figure D-9.1. Driving directions are provided in Figure D-9.2.

9.5 A map with driving instructions and a list of emergency numbers will be placed in each site vehicle. In addition, this information will be carried by all personnel with health and safety responsibilities.

Table D-9.1
Emergency Contacts

These contacts and maps should be available to all personnel at the site. Should any situation or unplanned occurrence require outside assistance or support services, the appropriate contact from the following list should be made:

CONTACT	NAME	PHONE
State Police, Fire, Ambulance		911
Program Health and Safety Officer	Tim Mustard	1-303-564-3537
Seneca Program Manager	Todd Heino	1-617-449-1405 (office) 1-339-206-7413 (cell)
Site Health & Safety Coordinator	TBD[1]	TBD[1]
Parsons Site Manager	TBD[1]	TBD[1]
Primary Client Contact	Steve Absolom	1-607-869-1309
Alternate Client Contact	Randy Battaglia	1-607-869-1523
State Spill Number		1-585-226-2466
Fire Department	Romulus	1-607-869-9611
Police Department	Interlaken	1-607-532-4466
National Response Center		1-800-424-8802
Poison Control Center		1-800-962-1253
Occupational Physician		1-800-874-4676
Life Care Medical Associates		1-315-539-9229
Geneva General Hospital		1-315-787-4000
Regional USEPA Emergency Response		1-732-548-8730
Parsons 24-Hour Emergency #		1-800-883-7300
Parsons Boston H&S		1-617-449-1574
Parsons Medial Director Assistant	Donna Miller	1-661-904-0978
PWEB Incident Reporting System	https://pwebtools.parsons.com/safety/	

[1] – Based on activity and field team members.

Figure D-9.1
Route to Life Care Medical Associates, 1991 Balsley Road, Seneca Falls, NY
from East side of Depot

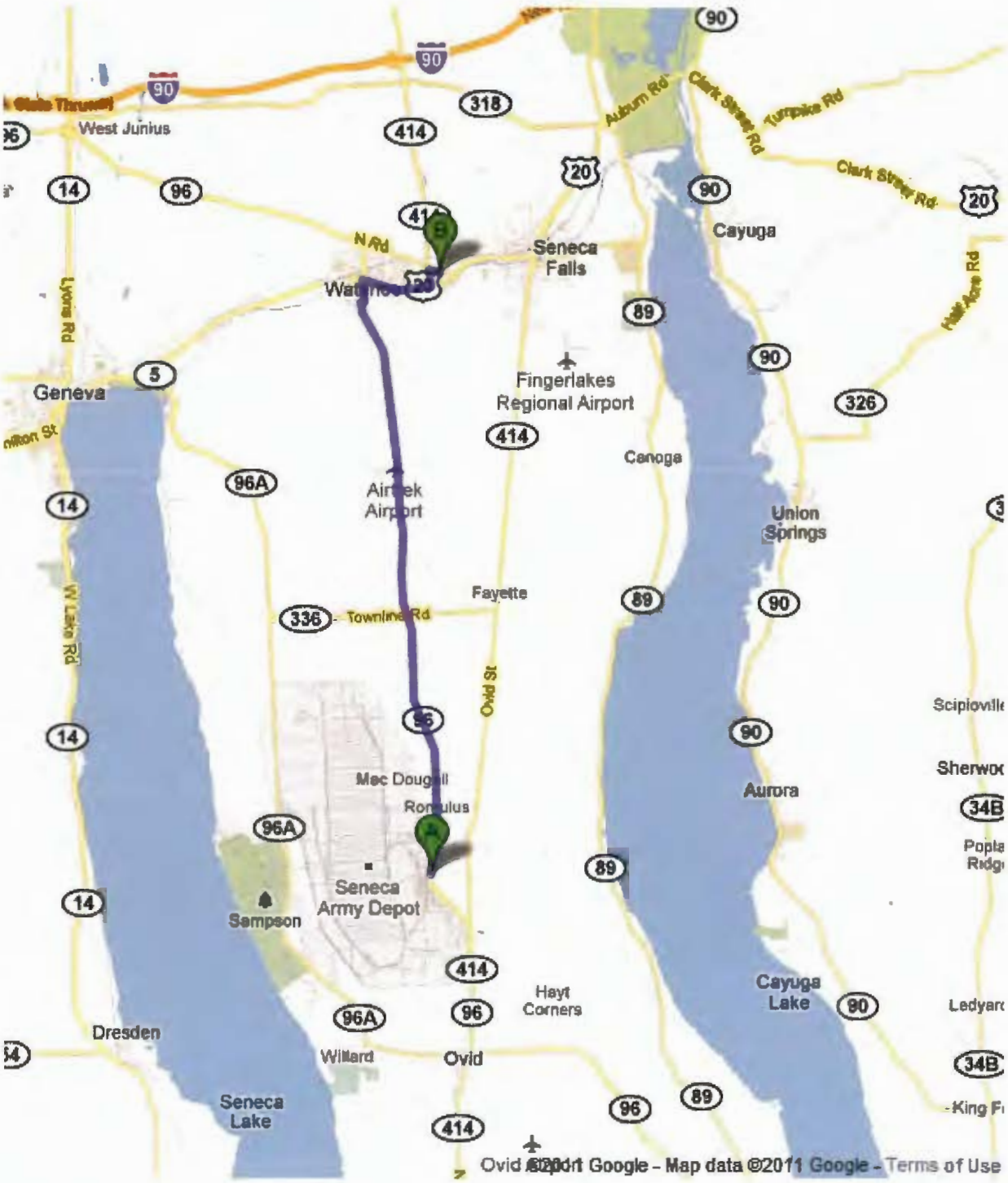

Figure D-9.2
Driving Directions from East Side of the Depot to Life Care Medical Associates, 1991 Balsley Road, Seneca Falls, NY

1	Exit Main Gate and Turn **LEFT** onto **NORTH NY STATE ROUTE-96**	Go 11.7 miles
2	Turn right onto W Illick St	Go 305 feet
3	Take the 1st left onto Washington St	Go 0.5 miles
4	Turn right onto **NY-5 E/US-20 E/E Main St**	Go 1.4 miles
5	Turn left onto **NY-414 N/Mound Rd**	Go 0.3 miles
6	Turn right onto **Balsey Rd**	Go 0.2 miles

Figure D-9.3
Route to Life Care Medical Associates, 1991 Balsley Road, Seneca Falls, NY
from West side of Depot

Figure D-9.4
Driving Directions from West side of Depot Route to Life Care Medical Associates, 1991 Balsley Road, Seneca Falls, NY

1	Head **north** on **New York 96A N** toward **Seneca Army Depot**	go 3.6 mi
2	Turn right onto **Co Rd 126/Yale Station Rd**	go 0.2 mi
3	Continue onto **NY-336 E/Townline Rd**	go 2.5 mi
4	Turn left onto **NY-96 N**	go 6.4 mi
5	Turn right onto W Illick St	Go 305 feet
6	Take the 1st left onto Washington St	Go 0.5 miles
7	Turn right onto **NY-5 E/US-20 E/E Main St**	Go 1.4 miles
8	Turn left onto **NY-414 N/Mound Rd**	Go 0.3 miles
9	Turn right onto **Balsey Rd**	Go 0.2 miles

Figure D-9.5
Route to Geneva General Hospital, 196 North Street, Geneva, NY
from East side of Depot

Figure D-9.6
Driving Directions to Geneva General Hospital, 196 North Street, Geneva, NY from East side of Depot

1	Head **north** on **NY-96 N** toward **Summerville Rd**	go 4.5 mi
2	Turn left onto **NY-336 W/Townline Rd**	go 2.8 mi
3	Continue onto **New York 96A N**	go 5.8 mi
4	Turn left onto **NY-5 W/US-20 W/Waterloo Geneva Rd**	go 1.9 mi
5	Turn right onto **Lake St**	go 466 ft
6	Turn right onto **Exchange St**	Go 0.4 mi
7	Turn left onto **North St**	go 0.5 mi

Figure D-9.7
Route to Geneva General Hospital, 196 North Street, Geneva, NY
from West side of Depot

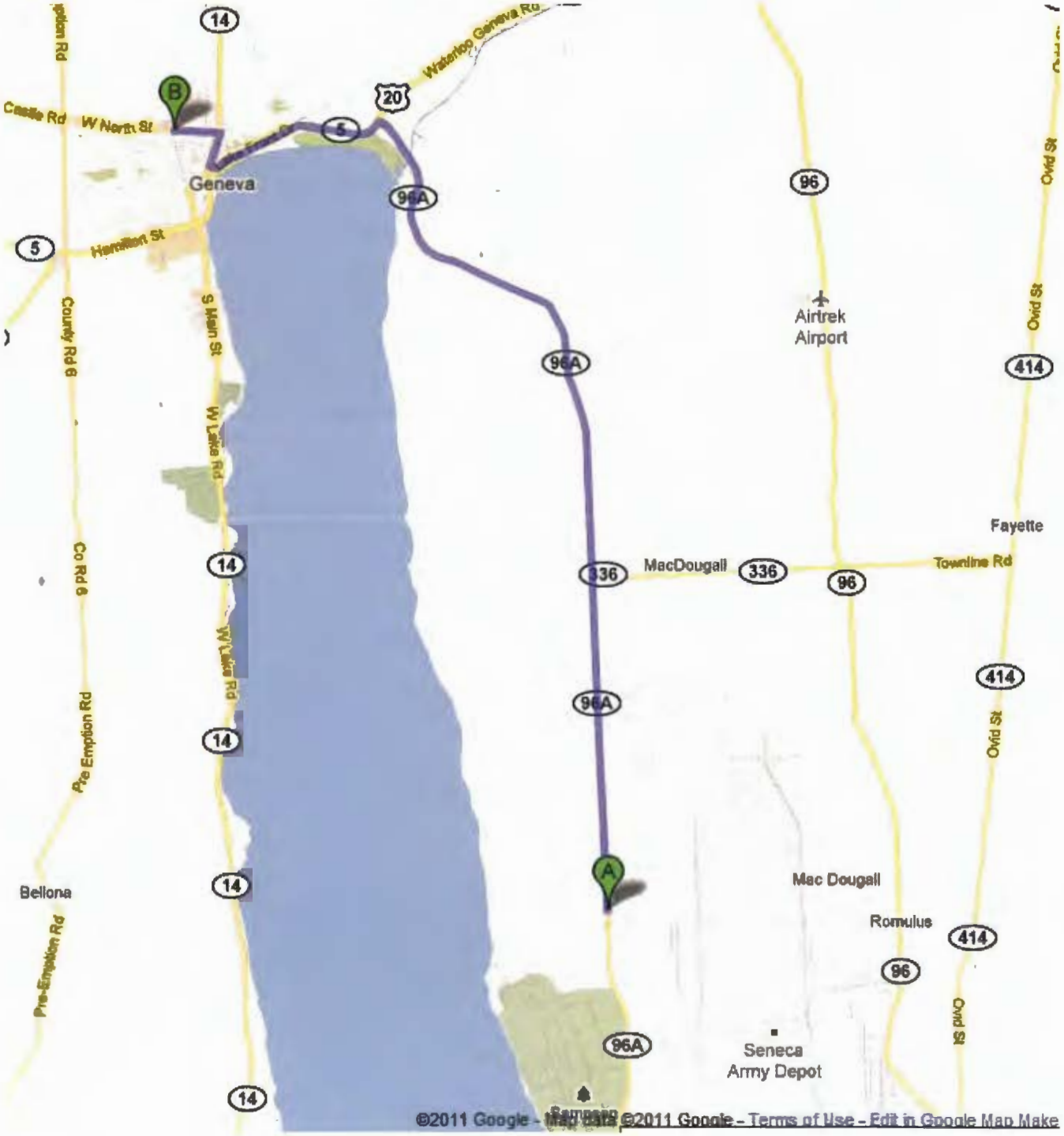

Figure D-9.8
Driving Directions to Geneva General Hospital, 196 North Street, Geneva, NY
from West side of Depot

1	Head North on **New York 96A N**	go 9.6 mi
2	Turn left onto **NY-5 W/US-20 W/Waterloo Geneva Rd**	go 1.9 mi
3	Turn right onto **Lake St**	go 466 ft
4	Turn right onto **Exchange St**	Go 0.4 mi
5	Turn left onto **North St**	go 0.5 mi

CHAPTER 10
PERSONAL PROTECTIVE EQUIPMENT

10.1. GENERAL REQUIREMENTS

Personnel performing site tasks will wear and use the appropriate level and type of PPE for each individual task and as otherwise specified in this plan. This SSHP makes provisions for use of Level D PPE in accordance with the hazards and contamination level anticipated for each task or operation. The following sections describe the PPE requirements for activities at the SEDA OD Grounds in Romulus, NY. The selection and use of PPE will be specified in the HASP, and will be project-specific. Due to the unknown nature of hazardous waste site work and the possibility of changing conditions during the conduct of the work, changes in the personal protective equipment may be required. When changes in personal protective equipment become necessary, these changes shall be made in accordance with the action levels and criteria the in this plan. Routine site work will be performed in Level D protection, augmented with steel toe boots, inner surgical gloves, and chemical-resistant outer gloves. In the event that PPE is ripped or torn, work shall stop and PPE shall be removed and replaced as soon as possible.

10.1.1. Responsibilities

10.1.1.1. The SSHO

The SSHO must ensure that:

- Personnel are trained in the proper wearing, donning, and doffing procedures for the PPE used at the site;
- PPE used is properly fitted;
- PPE is in good serviceable condition:
- Replacement PPE is on hand and serviceable; and
- PPE use complies with all applicable OSHA, USACE, and Parsons' regulations.

10.1.1.2. Site Personnel

All site personnel using PPE must ensure that:

- PPE is serviceable;
- PPE is clean; and
- Defective PPE will be turned in to the SSHO.

10.1.2. Hazard and Risk Assessment

Hazard and risk assessment is a continuing process and will be conducted throughout the duration of the project. As a general rule, levels of PPE will need to be reassessed if any of the following occur:

- Previously unidentified or unanticipated chemicals, conditions, or hazards are encountered;
- Ambient weather conditions affect the use of assigned PPE; or
- A new task is introduced or a previously assigned and evaluated task is expanded in scope.

10.1.3. PPE Changes

If work tasks are added to the project after approval of this SSHP that change the type or level of PPE, the SSHO will identify and assess the task hazards and relay that information to the PSHO and USAESCH Safety Specialist. The PSHO will prepare an amendment to the SSHP and submit the amendment for approval from USACE, as appropriate. The amendment will be added to the SSHP upon approval.

10.2. TASK-SPECIFIC LEVELS OF PPE

10.2.1. Special PPE Considerations

The following special considerations will be observed in the selection of PPE:

- Hard hats will be required when working around heavy equipment or when an overhead hazard exists.
- Steel toe/shank boots are not required during surface/subsurface location of MEC unless a serious toe hazard exists, whereupon a fiber safety toe will be used.
- Safety glasses will be selected that provide site personnel with the best protection from not only physical hazards, such as flying objects, but that also provide adequate splash protection. Safety glasses will be worn when an eye hazard exists (i.e., in wooded areas when using a chain saw or weed eater).
- The SSHO will continually evaluate site tasks to identify hazards and will provide necessary and appropriate PPE to ensure the safety and health of site personnel, regardless of the activity they perform.

10.2.2. Level D PPE

Level D PPE will be worn during the site activities and includes the following:

- Work clothes (i.e., long pants and shirt) or cotton coveralls. Tyvek coveralls may also be worn if handling heavy metal-contaminated soil.

- Leather work boots (disposable over boots may also be worn if deemed necessary). Safety toe may be required when working in conjunction with heavy equipment. Geophysical survey and reacquisition personnel will not use boots containing steel.
- Safety glasses with side shields or goggles when eye hazards exist.
- Hard hat when working around heavy equipment or when an overhead hazard exists.
- Hearing protection when high noise levels are present.
- Leather or canvas work gloves when a scrape or cut hazard exists.
- High visibility vest when working on or adjacent to public roads or near heavy equipment.
- Kevlar chaps and face shields when using chain saws or other brush- clearing equipment.
- Unless otherwise specified in the SSHP, Level D PPE is sufficient for all mobilization, site preparation, and demobilization activities at the OD Grounds.

10.3. PPE INSPECTION, MAINTENANCE, CLEANING, AND STORAGE

10.3.1 All PPE will be inspected initially by the SSHO and prior to use to ensure that it is functional and that its structural integrity has not been compromised. Re-usable PPE (such as safety glasses and hard hats) will also be inspected by the wearer after each use, prior to storage, and prior to maintenance. If site personnel find that a piece of PPE is defective, it will be reported to the SSHO and the defective article will be repaired or replaced.

10.3.2 Any PPE stored and designated as emergency rescue equipment will be inspected at least monthly to ensure that it has not been adversely affected by prolonged storage. Any equipment found to be defective will be replaced immediately. This inspection will be recorded in the appropriate log. All PPE will be used in compliance with the standard operating procedure for PPE included in Attachment 3 to this APP.

CHAPTER 11
SITE PLANS

The work at the remedial munitions response actions project at the OD Grounds will involve potentially hazardous activities during the course of operations. In order to prepare for the potential hazards, site plans have been developed and summarized to ensure the prevention of accidents.

11.1. LAYOUT PLAN

The layout plan for fieldwork at the SEDA OD Grounds in Romulus, NY includes work, exclusion, contamination reducation, and support zones. The zones for the project are covered in detail in Chapter 11 of the SSHP (Attachment 1 to this APP).

11.2. EMERGENCY RESPONSE PLAN

11.2.1. Procedures and Tests

11.2.1.1 The purpose of the Emergency Response and Contingency Plan (ERCP) is to define the general procedures to protect human health and the environment in the event of an accident or emergency during field activities. The emergency response procedures developed for this investigation comply with 29 CFR 1910.120(1) and address the following elements:

- Pre-emergency planning;
- Personnel roles, lines of authority, training, and communications;
- Posted instructions and emergency contacts;
- Emergency recognition and prevention;
- Criteria and procedures for site evacuation;
- Procedures for decontamination and medical treatment;
- Evacuation routes and procedures;
- Emergency alerting and response procedure; and
- Critique of emergency responses and follow-up.

11.2.1.2 Emergency telephone numbers for the closest hospitals capable of providing emergency service, Poison Control Center, local police and fire department, and key management personnel from the USACE and Parsons will be available to the SSHO and will be kept immediately available in the site vehicles and with the SSHO. The SSHO will be

responsible for keeping the list current and for taking necessary action and contacting the appropriate emergency resources in the event of an emergency.

11.2.1.3 If an emergency occurs while personnel are in site work zones, voice alarms or three blasts on an air horn (or vehicle horn) will be used to alert other site personnel that an emergency exists. On hearing the alarm, site personnel will cease work activities, secure the site, and proceed back through the marked ingress/egress corridor (if they are in the EZ) to assemble at the site vehicle/Command Post.

11.2.1.4 The overall responsibility during emergencies rests with the SSHO. In case of emergency, the SSHO will implement the site emergency procedures. The SSHO is specifically responsible for the following:

- Assessing the situation and determine the existing hazards, potential for additional hazards, and need for additional response. Ensure the hazardous condition is stabilized, eliminated, or permanently fixed. If personnel or properties are jeopardized, a determination must be made to alert the local community.
- Locating all victims, assessing their conditions, and making an on-scene determination of the resources needed to stabilize and transport.
- Implementing the site ERCP, including ordering site evacuations, coordinating firefighting efforts, and directing spill control and cleanup;
- Supervising site evacuation and decontamination procedures;
- Contacting emergency services such as the fire department, ambulance, and security services, as may be required or requested by the emergency rescue team;
- Assisting in providing first aid services and medical support or evacuation for injured or exposed personnel;
- Determining the cause of the incident and ways to prevent future occurrences; and
- Preparing a Form 3394 Accident Report for submission to the USACE.

11.2.1.5 On-site personnel are responsible for reporting emergencies immediately to their supervisors, alerting other employees, helping injured personnel, and assisting as directed to mitigate the incident.

11.2.1.6 Prior to initiating remedial munitions response actions field activities, the following training will occur under the direction of the SSHO:

- Hazard communication;
- Emergency numbers; and
- Emergency procedures.

11.2.1.7 The training conducted will be part of the initial training conducted as discussed in Subchapter 5.4 of this APP and may include a mock execution of the emergency plan.

11.2.2. Spill Plan

The occurrence of chemical leaks or spills is anticipated to be remote due to the preventative measures implemented on the site and the nature of the contaminated materials present. Procedures for responding to spills are outlined in Subchapter 6.2.4 of the work plan.

11.2.3. Firefighting Plan

Upon detecting a fire or explosion, employees will determine whether the fire is small enough to readily extinguish with immediately available portable extinguishers or water, or whether other fire-fighting methods are necessary. Non-essential personnel will be directed away from the area of the fire. The Fire Fighting SOP 18 in Attachment 3 of this APP will be followed by site personnel should fires arise.

11.2.4. Posting of Emergency Telephone Numbers

Emergency telephone numbers for the closest hospitals capable of providing emergency service, Poison Control Center, local Police and Fire Department, and key safety and management personnel from USACE and Parsons will be available to the SSHO and will be posted at the SZ Command Post and in other conspicuous locations. The SSHO will be responsible for keeping the list current and for taking necessary action and contacting the appropriate emergency contacts in the event of an emergency. Emergency contact numbers are provided in Table D-9.1, Chapter 9 – Medical Support, of this APP.

11.2.5. Wild Land Fire Prevention Plan

11.2.5.1 The Range Fire and Wildfire Operations SOP 36 in Attachment 3 of this APP will apply and be used by personnel to avoid inadvertently creating fires. These methods will also be followed by site personnel in the notification and treatment of fires should they arise.

11.2.5.2 Depending on the time of year, it may be necessary to take extra precautions in preventing wild fires. This can be accomplished by keeping vehicles on roadways and off the grassy areas, restricting smoking to one small area, and ensuring that any power equipment is not placed down on the grass.

11.2.6. Man Overboard/Abandon Ship

No water craft will be used during the fieldwork at the OD Grounds, so no Man Overboard/Abandon Ship Plan will be required.

11.3. HAZARD COMMUNICATION PROGRAM

Details on hazard communication training are presented in Subchapter 5.9 of this APP.

11.4. RESPIRATORY PROTECTION PROGRAM

11.4.1 The primary objective of respiratory protection is to prevent employee exposure to atmospheric contamination. When engineering measures to control contamination and respiration hazards are not feasible, or while they are being implemented, personal respiratory protective devices will be used.

11.4.2 It is highly unlikely that a respiratory protection plan will be required for fieldwork at the OD Grounds in Romulus, NY project site because the planned activities do not involve hazards that would necessitate respiratory protection. If dust becomes a problem, the field team will either temporarily cease operations or wet down the immediate area to minimize the generation of airborne particulates.

11.4.3 The criteria for determining respirator needs have been evaluated based on the PWS and the corresponding potential for respiratory hazards. Respiratory protection is not anticipated based on the current PWS. However, in the event that conditions change, the SSHO and the PSHO will determine the appropriate extent of personal exposure monitoring and/or mitigation measures necessary for site operations.

11.4.4 In the event that respirators are determined to be required, all respirator users will be OSHA-trained in proper respirator use and maintenance. The SUXOS and SSHO will observe workers during respirator use for signs of stress. The SUXOS and SSHO will periodically evaluate the implementation of the APP/SSHP to determine its continued effectiveness with regard to respiratory protection. All persons assigned to use respirators will have medical clearance to do so and receive fit-testing prior to respirator use.

11.5. HEALTH HAZARD CONTROL PROGRAM

The health hazard controls for the project are covered in detail in Chapter 2 of the SSHP (Attachment 1 to this APP).

11.6. LEAD ABATEMENT PLAN

Contact with lead is not anticipated as part of the operations to be conducted at the OD Grounds. In the unlikely event that lead is encountered during operations, workers will be required to avoid the area of contamination and consult with the SSHO and Site Manager for further instruction.

11.7. ASBESTOS ABATEMENT PLAN

Contact with asbestos is not anticipated as part of the operations to be conducted at the OD Grounds. In the unlikely event that asbestos is encountered during operations, workers will be required to avoid the area of contamination and consult with the SSHO and Site Manager for further instruction.

11.8. ABRASIVE BLASTING

Abrasive blasting will not be performed during the operations to be conducted at the OD Grounds.

11.9. CONFINED SPACE ENTRY

Confined space entry is not anticipated as part of normal operations at the OD Grounds. In the unlikely event that a confined space is required during field operations, personnel will stop work and will consult with the SSHO and PSHO for further instruction before continuing.

11.10. HAZARDOUS ENERGY CONTROL PLAN

The use of non-battery operated electrical equipment is not anticipated during field activities at the OD Grounds. However, should it become necessary to use mains power or a generator, a lockout/tag-out procedure will be used by site personnel if the associated equipment is being worked on or maintained. The lockout/tag-out procedure will ensure that any machine or equipment being worked on is isolated from all potential hazardous energy sources, and locked out or tagged out before any servicing or maintenance activity where the unexpected energization, start-up, or release of energy might result in an injury.

11.11. CRITICAL LIFT PROCEDURES

Crane lift operations are not expected to be necessary for operations at the OD Grounds. If required, development of lift plans will be in accordance with EM 385-1-1. All hoisting operations will be preplanned and the exact size and weights of loads to be lifted will be evaluated based on the manufacturing maximum load limits for the entire range of the lift. Lift geometry, including crane position, height of lift, load radius, and boom length and angle, for the entire range of lift will be documented. Crane operators will be checked for qualification with proper certification.

11.12. CONTINGENCY PLAN FOR SEVERE WEATHER

Severe weather is defined as high winds, electrical storms, tornadoes, extremely hot weather ($> 100°F$), or extremely cold weather ($< 0°F$). In the event that such conditions arise, it may be necessary to cease operations and evacuate the site. The SSHO will be responsible for monitoring the weather. Should severe weather conditions threaten, the SSHO is responsible for deciding if site operations should be halted. Procedures for action during severe weather are detailed in Subchapter 2.6.1 of the SSHP (Attachment 1 to this APP) and in SOP 16 - Severe Weather Operations, provided in Attachment 3 of this APP.

11.13. ACCESS AND HAUL ROAD PLAN

All roads used during field activities at the OD Grounds will be used in a safe manner to reduce any potential hazards involving vehicles. No construction of new roadways is planned during any of the fieldwork. Site vehicles will be driven in a safe manner by a licensed driver.

All speed limits on public roads will be observed, and speed on the site will be adjusted as appropriate for existing road conditions.

11.14. DEMOLITION PLAN

Project activities will not involve any structures or improvements; thus, no structural demolition will be required. In the event that demolition of MEC is required, the Demolition Operations SOP included in Attachment 3 of this APP will be followed. A subcontracted explosives distributor will provide demolition material and the UXO subcontractor will conduct demolition operations under the direct supervision of the SSHO.

11.15. EMERGENCY RESCUE (TUNNELING)

Tunneling will not be required as part of the operations at the OD Grounds and, therefore, emergency rescue procedures for tunneling are not necessary.

11.16. UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN

Underground construction will not be required as part of the operations at the OD Grounds and, therefore, an Underground Construction Fire Prevention and Protection Plan is not necessary.

11.17. COMPRESSED AIR PLAN

Compressed air will not be used during the operations at the OD Grounds and, therefore, a Compressed Air Plan is not necessary.

11.18. FORMWORK AND SHORING ERECTION AND REMOVAL PLAN

Formwork and shoring erection operations is not anticipated as part of site operations. In the event that shoring is required, it will be erected and handled in accordance with manufacturer's instructions.

11.19. JACKING PLAN (LIFT)

Lift-slab operations will not be conducted at the OD Grounds and, therefore, a Jacking Plan is not necessary.

11.20. BLASTING PLAN

Details specific to explosives operations conducted on-site are presented in Chapter 3 – Field Investigation Plan, and Chapter 5 – Explosives Management Plan, of the work plan, and in the SOPs in Attachment 3 of this APP.

11.21. DIVING PLAN

Diving operations will not be conducted at the OD Grounds and, therefore, a Diving Plan is not necessary.

11.22. PREVENTION OF ALCOHOL AND DRUG ABUSE

Parsons will institute and maintain a program for achieving the objective of drug free workspace. Parsons ensures consistent and uniform application of this policy and, when required, interfaces with supervisor and employee to evaluate performance and behavior.

11.22.1. Parsons Corporate Statement of Policy

11.22.1.1 Parsons expects all employees to report to work in a fit condition in order to perform their duties at the utmost levels of safety and efficiency. To that end, Parsons expressly prohibits the unlawful manufacture, distribution, dispensing, possession, use, or sale of a controlled substance or alcohol on its premises at any time. Employees are prohibited from being at work under the influence of these substances. Parsons will reasonably accommodate the efforts of an employee to obtain medical treatment for substance abuse and to return to employment thereafter. However, no provisions of this policy will contravene the provision of the Employee Personal Conduct Policy or preclude the corporation from terminating an employee in accordance with this policy.

11.22.1.2 Parsons has an obligation to safeguard the privacy rights of all employees; however, it is also committed to provide a healthy and safe work environment for all employees and to take reasonable steps to safeguard the health and safety of others and protect the environment in conducting its business.

11.22.2. Safety and Environmental Provisions

11.22.2.1 In some instances employees may be required to undergo random toxicological tests to ensure their continuing fitness for duty to comply with contract mandated requirements or government regulations, or if performing work at locations where the nature of their duties is such that there is the potential for serious physical injury to themselves, to others, or the general public, or potential for significant damage to property or the environment.

11.22.2.2 Assignment of employees to such job sites will be done on a voluntary basis. Employees who refuse to participate in the random testing program and whose job duties would normally expose them to random testing, will be considered for placement in other positions not requiring random testing. Every reasonable effort will be made to accommodate such transfers; however if suitable work for which the employee is qualified is not available, the employee will be subject to termination. A positive test result will lead to immediate removal from the site, in addition to either corrective action in accordance with this policy or the employee's termination in accordance with the Employee Personal Conduct Policy.

11.22.2.3 Searches are another means of protecting the safety of individuals and property at those locations where the nature of the work has the potential for serious injury or damage. Reasonable searches may be conducted of individuals, their personal vehicles, effects, and other areas under the individual's control while at such work sites, or engaged in Parsons business at such sites.

11.22.2.4 Employees will not be detained or searched without their consent. An employee's cooperation in a search at such work sites is a condition of employment. The employee will be required to sign an Acknowledgment and Consent for Random Toxicological Tests and Searches form. Such testing will be performed by the company using qualified contracted agents, or trained employees.

11.22.3. Substance Abuse Testing - Employment Offer

No candidate for employment will be subjected to substance abuse testing prior to the receipt of an offer of employment. Offers of employment, regardless of employment category, must contain a contingency regarding satisfactory completion of substance abuse testing. Failure to submit to or pass an examination will result in immediate disqualification from consideration for placement.

11.22.4. Employee Personal Conduct

11.22.4.1 Employees bear the primary responsibility for their own job performance and for taking any action or undergoing treatment necessary to maintain performance at a satisfactory level.

11.22.4.2 In addition, the Corporation may require an employee to submit to a test for alcohol or illegal drugs, based upon reasonable suspicion that the employee's performance or behavior is being adversely affected by use of such substance(s). Reasonable suspicion will be based upon physical manifestations of impairment, or unsatisfactory behavior or job performance (including on-the-job accident or injury) which causes the supervisor and Human Resources Representative to reasonably believe that alcohol or drug abuse may be a contributing factor. Refusal by an employee to take such a test will be viewed as an admission of such use by the employee.

11.22.5. Confidentiality of Records

All information concerning an applicant's or employee's medical condition or test results will be kept strictly confidential, with information released only upon a legitimate need-to-know basis.

11.23. FALL PROTECTION PLAN

Activities to be performed at the OD Grounds are not anticipated to require fall protection. However, if workers have the potential to become exposed to fall hazards, proper precautions will be implemented to ensure safety. Standard guardrail, catch platforms, temporary floors, and

safety nets will be used based on evaluations by the SSHO. In addition, full-body harnesses with a shock absorbing lanyard will be worn by any personnel working at risk of falling more than 6 feet. The lanyard will be adjusted to limit free-fall to no more than 6 feet. Lanyards must be secured to strong structural components (breaking strength of 5,000 pounds per attached employee) or lifelines.

11.24. STEEL ERECTION PLAN

There will be no requirement for erection of steel structures during operations at the OD Grounds and, therefore, a Steel Erection Plan is not necessary.

11.25. NIGHT OPERATIONS LIGHTING PLAN

All field operations at the OD Grounds will be performed during daylight hours (dawn to dusk).

11.26. SITE SANITATION PLAN

The sanitation provisions specified in Section 2 of EM 385-1-1 will be established and maintained on-site as outlined in the following paragraphs. The site sanitation controls for the project are covered in detail in Chapter 12.2 of the SSHP (Attachment 1 to this APP).

11.27. FIRE PREVENTION PLAN

To ensure adequate fire prevention, the SSHO will inspect the site to ensure that all flammable and combustible materials are being safely stored in appropriately configured storage areas and containers. The SSHO will also ensure that no flammable/combustible materials are stored near any sources of ignition. Portable fire extinguishers will be located on site. In the event of fire, the firefighting procedures outlined in the ERCP in Subchapter 11.2.3 of this APP will be followed.

CHAPTER 12
CONTRACTOR INFORMATION

12.1. GENERAL

Parsons and its subcontractors will meet the requirements of the applicable sections of this APP by following the SSHP provided in Attachment 1 and the SOPs provided in Attachment 3, of this work plan.

12.2. STANDARD OPERATING PROCEDURES

The following Parsons SOPs are provided in Attachment 3 of this APP:

- Parsons SOP Number 1, Demolition Operations
- Parsons SOP Number 2, Explosive Storage and Transportation (ESAT)
- Parsons SOP Number 3, White Phosphorus
- Parsons SOP Number 4, Personal Protective Equipment
- Parsons SOP Number 5, Hearing Conservation Program
- Parsons SOP Number 6, Lockout Tagout
- Parsons SOP Number 7, Medical Surveillance, Control/Access to Employee Medical Records, and Emergency Care
- Parsons SOP Number 8, Emergency Response and Fire Prevention Plan
- Parsons SOP Number 9, Hazard Communication Program
- Parsons SOP Number 10, Electrical Safety
- Parsons SOP Number 16, Severe Weather Operations
- Parsons SOP Number 18, Fire Fighting Plan
- Parsons SOP Number 34, Conventional Ordnance
- Parsons SOP Number 36, Range Fire and Wildfire Operations
- Parsons SOP Number 37, Material Potentailly Presenting an Explosive Hazard, Inspection, Certification and Final Disposition
- Parsons SOP Number 38, Establishment and Control of Medical Evacuation
- Parsons SOP Number 41, Evacuation Plan

CHAPTER 13
SITE SPECIFIC HAZARDS AND CONTROLS

Detailed site specific hazards and controls are provided in the AHAs for each activity conducted during the remedial investigation. The AHAs for the following activities are provided in Attachment 2 of this APP.

- Anomaly Reacquisition and Surveying
- Demolition Operations
- Digital Geophysical Mapping (DGM)
- Explosive Storage and Transportation (ESAT) Operations
- Fueling Operations
- General Site Construction Operations
- Intrusive Investigations in Conventional/CWM/HTRW Operations
- Mobilization/Demobilization
- Material Potentially Presenting an Explosive Hazard (MPPEH) Inspection and Munition Debris (MD) Turn-in
- Portable Hand Held Power Tools, Saws, Grinders, and Pneumatic Tool Operations
- Vegetation Removal
- Emergency Resuscitation Operations
- Rugged Terrain
- Sweep Clearance
- Investigation Derived Waste (IDW)
- Generator Operations

ATTACHMENTS

Attachment 1 Site Safety and Health Plan

Attachment 2 Activity Hazard Analyses

Attachment 3 Standard Operating Procedures

ATTACHMENT 1

SITE SAFETY AND HEALTH PLAN

FINAL

APPENDIX D, ATTACHMENT 1
SITE SAFETY AND HEALTH PLAN

SENECA ARMY DEPOT ACTIVITY (SEDA)
OPEN DETONATION GROUNDS
MUNITIONS RESPONSE ACTIONS
at
ROMULUS, NEW YORK

Prepared for:

U.S. Army Engineering and Support Center, Huntsville

Contract No. W912DY-08-D-003
Task Order 13

Prepared by:

PARSONS
100 High Street,
Boston, Massachusetts

Revision 2
January 2012

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CHAPTER 1
SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

The Accident Prevention Plan (APP) and this Site Safety and Health Plan (SSHP) describe the procedures to be implemented during the conduct of the munitions response operations at the SEDA Open Detonation (OD) Grounds, referred to hereafter as "site". Attachment 3 of the APP contains the SOPs referenced throughout this SSHP.

1.1. SITE DESCRIPTION

A description of the OD Grounds including location, history, previous investigations, topography, and climate is contained in Chapter 1 of the work plan.

1.2. CONTAMINATION CHARACTERIZATION

Based on historical information and previous investigations at the OD Grounds, the munitions of concern, along with their constituents, are listed in Chapter 1, Table 1.1, of the work plan.

CHAPTER 2
HAZARD AND RISK ANALYSIS

2.1. INTRODUCTION

2.1.1. Work activities, natural phenomena, and biological hazards, may present a risk to the field team(s) on this project. The level of risk is dependent upon the type of work being done. This chapter identifies MEC, physical, chemical, and biological hazards associated with the tasks scheduled to be performed on this project and outlines the procedures that are to be employed to prevent accidents, injuries, and illness. The SSHP is designed to protect the site personnel, the public, and the environment.

2.1.2. Personnel working most directly with intrusive anomaly investigations will have the greatest chance of encountering possible MEC hazards. However, all project personnel and visitor/authorized entrants to the site will be expected to be aware of the guidance provided by this document and comply with all applicable safety and health requirements.

2.2. ACTIVITY HAZARD ANALYSIS

2.2.1. Individual hazard analyses have been performed for the tasks associated with the SEDA OD Grounds investigations. The potential hazards have been identified; control measures have been outlined; training requirements and PPE requirements and equipment inspection procedures have been established. The following activities are considered in preparing the Activity Hazard Analyses (AHAs):

- Mobilization/Demobilization
- Vegetation Removal
- Rugged Terrain
- General Site Construction
- Digital Geophysical Mapping
- Anomaly Reacquisition
- Intrusive Investigation of anomalies/target
- Sweep Clearance
- Emergency Rescue Operations
- MPPEH/MD Operations
- Demolition Operations
- Investigation Derived Wastes (IDW)

- Portable Handheld Power Tools
- Generator Operations
- Fueling Operations
- Explosive Storage and Transportation

2.2.2. Attachment 2 to the APP contains AHAs for each of the major tasks identified for the OD Ground munitions response actions, including potential hazards, control measures, and training and PPE requirements.

2.2.3. If new operations/tasks are introduced, a hazard analysis will be performed by the PSHO. If operations change significantly during the course of this project, the related AHA will be updated to accommodate these changes. Any changes in PPE or operating procedures will be approved by the PSHO before they are implemented, and will be communicated to the field team(s) during daily tailgate safety meetings. It will be the responsibility of the SSHO to ensure that the required controls are being properly implemented for each operation or task.

2.3. CLASSIC SAFETY

Safety hazards are expected to be present at all of the sites and include slip trip and falls, weather (thunderstorms, lightning, etc.) and fire. The policies and procedures described in Sections 3 and 10 of the Generic Site Wide HASP for these hazards shall be employed while work is being conducted under this HASP.

2.3.1. Slip, Trip, and Fall Hazards

2.3.1.1. Hazard Identification

Work areas may contain slip, trip, and fall hazards for site workers, such as:

- Holes, pits, or ditches;
- Slippery surfaces;
- Uneven grades;
- Sharp objects such as nails, metal shards, and broken glass; or
- Weather conditions, such as thunderstorms and heavy rainfall, which make surfaces slippery and obscure visibility.

2.3.1.2. Hazard Mitigation/Prevention

Site personnel will be instructed to look for these potential safety hazards and immediately inform the SSHO and the USAESCH Ordnance and Explosives Safety Specialist (OESS) about any encountered and/or new slip, trip, or fall hazards. If the hazard cannot be immediately removed or mitigated, action will be taken to notify site personnel about the hazard. Slips, trips, and fall hazards will be a daily tailgate safety briefing item. Operations will cease if weather conditions should cause activities to become hazardous.

2.3.2. Underground Utilities

2.3.2.1. Hazard Identification

Underground utility lines may be present at the OD Grounds that may pose hazards during the intrusive operations, including both manual and mechanized excavations. The specific hazards include, but are not limited to, utilities such as sewers, telephone, cable, fiber optic, water, fuel, gas, and electrical lines.

2.3.2.2. Hazard Mitigation/Prevention

The local utility locating hotline will be contacted to identify the locations of buried utilities 48 hours before subsurface activities are allowed to commence. Prior to beginning any intrusive activities, the Parsons SM will obtain a digging clearance if appropriate, and document phone calls, correspondence, and confirmation numbers. Site personnel will not enter underground utilities. In the event the local utility service cannot access all areas of the site where utilities may be located, geophysical instruments and utility locators will be used to scan for buried utilities.

2.3.3. Motor Vehicles and Heavy Equipment

2.3.3.1. Hazard Identification

Site tasks such as site preparation, brush clearing, excavation, and vehicle and/or heavy equipment operation may present a hazard. Injuries can result from being hit or run over by a moving vehicle, from vehicles overturning, or from being struck, burned, or otherwise injured by moving parts.

2.3.3.2. Hazard Mitigation/Prevention

Procedures for mitigation and prevention of hazards associated with motor vehicles and heavy equipment are contained in SOP 12 - Heavy Equipment and Vehicle Safety.

2.3.4. Excavation Safety

2.3.4.1. Hazard Identification

When excavations exceed a depth of five feet, potential hazards include:

- Cave ins;
- Items falling into the excavation; and
- Personnel falling into the excavation.

2.3.4.2. Hazard Mitigation and Prevention

The SOP 13 - Safety Considerations during Trenching and Excavation contains procedures to mitigate and prevent trenching and excavation hazards.

2.3.5. Electrical Energy, Lockout/Tagout

2.3.5.1. Hazard Identification

It is important to be aware of electrical safety to prevent electrical accidents. Accidents occur when electrical equipment is not properly used and/or installed. Accidents also occur

when equipment is not properly isolated, shut down, and/or de-energized (i.e., Lockout/Tagout procedures are not used).

2.3.5.2. Hazard Mitigation/Prevention

2.3.5.2.1. The SOP 10 - Electrical Safety contains procedures for mitigating and preventing electrical hazards.

2.3.5.2.2. Lockout/Tagout procedures will be used for all maintenance procedures to ensure the equipment is isolated from all potential hazardous energy sources (electrical and mechanical). Lockout/Tagout procedures are provided in SOP 6 - Lockout/Tagout Program.

2.4. EXPLOSIVE ORDNANCE

2.4.1. Hazard Identification

As a result of the former use of the SEDA OD Grounds and based on the results of previous investigations at the site, it is highly possible that the field teams may encounter MEC items that have been fired, buried, or abandoned, and that still represent a hazard. The MEC hazards of concern at the site are listed in Chapter 1, Table 1.1, of the work plan.

2.4.2. Hazard Mitigation/Prevention

2.4.2.1. All site personnel will be given ordnance recognition training prior to working on the site. The training will be verified by signature on the site training form. Personnel should be alert for UXO and munitions debris.

2.4.2.2. The following general precautions concerning MEC will be observed at all times:

- DO NOT touch or move any MEC item(s) regardless of the markings or apparent condition.
- DO NOT use radios or cellular phones near suspect MEC items.
- DO NOT walk across an area where the ground cannot be seen.
- DO NOT drive vehicles into a suspected MEC area; use clearly marked lanes.
- DO NOT carry matches, cigarettes, lighters, or other flame-producing devices onto an active excavation site.
- DO NOT rely on color code for positive identification of MEC items or their contents.
- Approach MEC items from the side; avoid approaching the front or rear areas.
- Always assume MEC items contain a live charge until it can be ascertained otherwise.

2.4.2.3. The following actions will be taken if MEC is found:

- Personnel who are not UXO-qualified will leave the immediate vicinity and clearly mark the location from a safe distance. DO NOT touch, move or otherwise disturb the item.
- Do not be misled by markings on the MEC item stating or indicating that the item is either practice or inert. Even practice bombs have explosive charges that are used to mark/spot the point of impact, or the item could be incorrectly marked.
- Immediately notify the SSHO, SUXOS, and the SM upon locating any suspect UXO/MEC. The SM will notify the Parsons PM, and the SSHO will notify the OESS.

- Operations in the immediate area of the suspect UXO/MEC will be halted and the appropriate Contingency Plan (Chapter 15.4 of this SSHP) will be implemented.

2.5. CHEMICAL HAZARDS

2.5.1. Hazard Identification

No chemicals of concern are known to be present in the area of investigation under this task order.

2.5.2. Hazard Mitigation/Prevention

The potential hazards from chemicals of concern will be minimized through the use of proper PPE (Chapter 5 of this SSHP). Details on hazard communication training are presented in Chapter 5.8 of the APP (Appendix D of the work plan).

2.6. PHYSICAL HAZARDS

The primary physical hazards potentially associated with this project are expected to include:

- Severe weather;
- Lightning;
- Hazardous noise;
- Heat stress; and
- Cold stress.

These hazards and mitigation actions are discussed in the following subsections.

2.6.1. Severe Weather

2.6.1.1. Hazard Identification

During the course of field operations, severe weather may be encountered, including thunderstorms, rainstorms, tornados, and other unsafe weather conditions (i.e., high winds). Criteria indicating that severe weather conditions may exist include:

- High winds (greater than 40 miles per hour – depending on the tree cover and other site specific conditions);
- Tornado watch or warning in place for the area;
- Visible lightning;
- Extreme temperatures (e.g., greater than 100°F or less than 32°F); or
- Heavy rainfall or fog that makes footing treacherous and visibility difficult.

2.6.1.2. Hazard Mitigation/Prevention

2.6.1.2.1. In the event of severe weather, it may be necessary to cease operations and evacuate the site. The SSHO will be responsible for being aware of local weather forecasts and monitoring the weather. Weather forecasts will be monitored using a combination of local radio and television broadcasts, internet, and a weather radio. Should severe weather threaten, the SSHO will be responsible for deciding if site operations should cease.

2.6.1.2.2. In the event that work is suspended, the SSHO will notify the teams and individuals via radio or cellular telephone. These individuals will be responsible for relaying the work suspension to other personnel in their areas. All personnel will cease operations, secure equipment, if time permits, and expeditiously move to designated assembly areas for further instruction. Once the severe weather hazard has passed, the SSHO will notify the SM that work may resume.

2.6.2. Lightning

2.6.2.1. Hazard Identification

Lightning's distance from a given person's position can be estimated by noting the time from its flash to the bang of the associated thunder. For each 5-second count from flash to bang (F-B), lightning is 1 mile away. Thus, an F-B of 10 means that lightning is 2 miles away and an F-B of 15 means that lightning is 3 miles away, and so on. Because the distance from Strike A to Strike B to Strike C can be 0.5 to 1.5 miles apart, the lightning safety evacuation plan will be implemented at a count of 50 (10 miles), or as soon as lightning is observed or thunder is heard.

2.6.2.2. Hazard Mitigation/Prevention

2.6.2.2.1. If a lightning storm is observed, all outdoor site activities will cease and personnel will seek safe shelter. A safe shelter may consist of:

- Fully enclosed metal vehicles with windows up and vehicle radio off;
- Enclosed buildings; or
- Low ground.

2.6.2.2.2. Unsafe shelter areas include all nearby outdoor metallic objects such as flag poles, fences, high mast light poles, gates, etc. Trees, water, and open fields will be avoided, and personnel will avoid using the telephone.

2.6.2.2.3. Feeling one's hair standing on end and/or hearing "crackling noises" are signs of being in lightning's electric field. Individuals experiencing these signs will immediately remove objects containing metal or metal parts (including baseball caps), place their feet together, duck their head, and crouch down with their hands on their knees. A waiting period of at least 15 minutes from the last nearby lightning strike will be observed before resuming activities.

2.6.2.2.4. People who have been struck by lightning do not carry an electrical charge in their bodies and are safe to handle. Cardiopulmonary resuscitation (CPR) will be performed immediately on victims of a lightning strike by someone qualified to do so. Additionally, emergency help will be immediately sought. See SOP 16 Severe Weather Operations for lightning safety procedures.

2.6.3. Hazardous Noise

2.6.3.1. Hazard Identification

2.6.3.1.1. Planned activities will involve the use of heavy equipment, such as weed trimmer, bobcats, backhoes, and other noise-producing equipment. The unprotected exposure of site workers to this noise during activities can result in noise-induced hearing loss.

2.6.3.1.2. A hazardous noise condition exists when communication between individuals separated by three feet requires shouting.

2.6.3.2. Hazard Mitigation/Prevention

2.6.3.2.1. Hearing protection is required any time the noise level reaches 85 dbA or greater or when communication between individuals separated by 3 feet requires shouting. Double protection is required anytime noise levels exceed 100 dbA. The SSHO will ensure that either ear muffs or disposable foam earplugs are available to, and used by, all personnel near sources of hazardous noise.

2.6.3.2.2. Where equipment generates high levels of continuous or impact noise, the SSHO will conduct a noise survey using a sound level meter to verify that appropriate PPE is being utilized.

2.6.4. Heat Stress

A detailed discussion of heat stress symptoms, mitigation, and prevention is provided in Chapter 8 of this SSHP.

2.6.5. Cold Stress

A detailed discussion of cold stress symptoms, mitigation, and prevention is provided in Chapter 8 of this SSHP.

2.7. IONIZING RADIATION

The only known source of ionizing radiation is the field radiographic unit (x-ray equipment) that will be used to assess potential MEC items. Potential ionizing radiation hazard, mitigation, and prevention are included in the X-ray SOP for the x-ray equipment that will be used and can be found in Attachment 3 to the APP. Misuse or carelessness during operation could result in injury or death. Only a trained, authorized operator will operate the equipment. The authorized operator(s) will be enrolled in a dosimeter/film badge program and will wear a dosimeter when operating the equipment. The x-ray equipment operator must establish a 200 ft exclusion zone (EZ) before use and maintain a minimum of 20 feet to the rear of the unit during operation. The unit will be calibrated and leak tested in accordance with the manufacturer's specification. Only an appropriate number of pulses will be used to radiate a given item. Never use the x-ray equipment with unauthorized personnel in the EZ. Report any suspected overexposure to the SSHO immediately.

2.8. BIOLOGICAL HAZARDS

Biological hazards are expected to be present at all of the sites and include poison ivy, ticks, snakes, spiders, insects (mosquitoes, bees, wasps, etc.) and bloodborne pathogens. The policies and procedures presents in Section 3.5 of the Generic Site Wide HASP for these hazards shall be employed while work is being conducted under this HASP.

CHAPTER 3
STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

3.1. INTRODUCTION

All Parsons site personnel and Parsons' subcontractors performing duties or working in areas where there is potential for exposure to hazardous material will meet the training requirements of OSHA 29 CFR §1910.120 before working on-site. Site personnel and their duties are outlined below.

3.1.1. Parsons Project Manager is responsible for all Parsons personnel and subcontractors on-site and designates duties to the on-site personnel. Parsons' Task Manager for this project is:

Mr. Todd Heino
Parsons
100 High Street, 4th Floor
Boston, MA 02110
Office Phone: 617-449-1405 Fax: 617-946-9777
Page: 617-946-9400

3.1.2. The Program Safety and Health Officer (PSHO), Mr. Tim Mustard, CIH (Parsons Denver office), is responsible for oversight and direction to ensure full compliance with all health and safety issues at the project site. The PSHO will oversee all aspects of site safety, including: the preparation of this HASP, performance of the initial site-specific training, and the periodic auditing of site operations to verify OSHA, COE, and HASP compliance.

3.1.3. The Site Safety and Health Officer (SSHO) for this project will be Ben McAllister. The SSHO is responsible for carrying out the provisions of the HASP with regard to site work, and will ensure that all personnel entering the site understand and adhere to the provisions of the HASP and that personnel meet the training and medical monitoring requirements of 29 CFR §1910.120. Any changes in the provisions of the HASP shall be made in writing by the SSHO and shall be approved by the PSHO or Corporate Health and Safety Officer. Any personal protective equipment upgrades or downgrades shall be documented in writing by the SSHO. The SSHO shall have the authority to stop an operation or site work if, in the opinion of the SSHO, the site conditions or the manner in which the work is being conducted, presents a hazard to site personnel, surrounding populations, or the environment. The SSHO is responsible for all air monitoring. Air monitoring requirements for this project are set forth in Section 8 of this document.

3.1.4. Field personnel will be involved in sampling, inspections, field monitoring, and decontamination, as specified in the Work Plan for each individual site. Site personnel will only perform tasks for which they have received appropriate training.

3.2. RESPONSIBILITES

3.2.1. The responsibilities of all on-site personnel are described in Table A-6 of the Generic Site Wide HASP. The list of program contacts and other important project related information is provided in Table D-9.1 of the APP.

3.2.2. Site visitors will not be allowed into active work areas [also referred to as exclusion zones (EZs)] without making arrangements with the resident Army client and Parsons well in advance of the planned visit. In addition, Parsons will deny visitor's access to any active EZ unless they present written documentation of the following items:

- Appropriate, up-to-date hazardous waste operations training;
- Current participation in a medical surveillance program per requirements of 29 CFR § 1910.120; and
- Evidence of the ability to use a respirator in accordance with 29 CFR §1910.134.

3.2.3. While Parsons may be able to provide a limited amount of PPE, site visitors will be responsible for coordinating PPE needs and available supplies with Parsons prior to their arrival at the site. Site visitors will be required to wear appropriate PPE, as dictated by Parsons and the HASP during the visit. In addition, it is Parsons general policy to suspend active site operations during site visitations by outside observers. If visits to view active operations are required and necessary, Parsons will expect advance notice of the planned site visit so necessary arrangements and coordination can be discussed and reviewed.

3.2.4. Once visitors have provided Parsons with sufficient information and documentation to document their acceptability to visit a site, they will be briefed by a qualified person on the hazards expected on the site and the health controls required. They will be escorted by the site manager, or his/her designee, and will sign the visitor sign-in/out log. All visitors will be required to follow all advice and instructions provided by the Parsons' Site manager, and SSHO. Failure to follow instructions or guidance may endanger the health and safety of the site visitor and other site personnel. Visitors not complying with provided site guidance and instructions will be escorted from the site. Visitors to the site not satisfying the above conditions will be denied access to active sites under Parsons' control.

CHAPTER 4
TRAINING

4.1. The health and safety training requirements as identified in Section 5 of the Generic Site Wide HASP and summarized below shall be employed while work is being conducted under this HASP.

4.2. All site personnel involved in hazardous waste work should meet the training requirements set forth in 29 CFR §1910.120(e) including:

- Employees engaged in hazardous waste site work should have received 40 hours of training in hazardous waste site operations and safety procedures and an annual 8 hour refresher course.
- Field personnel will have had at least three days of field experience under the supervision of a trained supervisor.
- Supervisors, the SSHO, and site managers should receive an additional 8 hours of specialized training on the safe management of site operations prior to the start of the fieldwork.
- Additional training should be provided to those personnel designated to respond to site emergencies. At least two people on-site will be currently certified in First Aid and CPR.

4.3. On-site safety training will consist of:

- Initial Site Training consisting review of this HASP,
- Daily Safety Briefings,
- Emergency Response,
- Ordnance Recognition;
- Hazard Communication, and
- Visitor.

4.4. Each worker's attendance and completion of this training will be documented by the SSHO using the form provided in Appendix F, Contractor Forms, of the work plan. Additionally after the training each person will sign the Plan Acceptance Form, (Appendix F, Contractor Forms, of the work plan) attesting to their understanding and acceptance of the HASP. All copies of the forms will be kept on file.

CHAPTER 5
PERSONAL PROTECTIVE EQUIPMENT

5.1. The criteria for the selection of personnel protection equipment (PPE) as presented in Section 6 of the Generic Site Wide HASP shall be employed while work is being conducted under this HASP. It is anticipated that Level D PPE will be worn for fieldwork at the OD Grounds. Level D PPE will consist of:

- Standard work clothes with long pants;
- Hearing protection (when working around heavy equipment);
- ANSI- approved safety glasses with side shields (goggles must be worn when splash hazard is present);
- All leather, above the ankle steel-toed safety boots;
- ANSI- approved hard hat (when working around heavy equipment or an overhead hazard exists);
- Nitrile outer gloves (must be worn during all activities requiring contact with soils/groundwater);
- Leather gloves (drilling operations); and
- High visibility safety vest.

5.2. A modified Level D PPE will be worn for the site inspections tasks since the work activities are non-intrusive. Modified Level D PPE will consist of:

- Standard work clothes with long pants;
- ANSI- approved safety glasses with side shields (optional);
- ANSI- approved hard hat (optional);
- All leather, above the ankle steel-toed safety boots; and
- High visibility safety vest.

5.3. The first aid kits for the treatment of minor injuries and burns shall be inspected by the SSHO at least weekly to ensure adequate supplies are available and in proper working order. The first aid kits, fire extinguishers, and handheld eyewash will be available at the work site in the support zone.

CHAPTER 6
MEDICAL SURVEILLANCE

6.1. The medical surveillance program as presented in Section 7 of the Generic Site Wide HASP shall be implemented for those Parsons employees who will be working on the SEAD sites. The program requires all field personnel receive medical examinations:

- Prior to site activities;
- Annually;
- Upon termination;
- Following exposure or injury; and
- Additionally as needed on a case-specific basis.

CHAPTER 7
EXPOSURE AIR MONITORING AND AIR SAMPLING PROGRAM

7.1. An air monitoring plan has been developed to protect the workers involved in the munitions response action. Public health and safety is ensured by monitoring within the work zone and creating an exclusion zone surrounding the investigation area. Perimeter air monitoring will be conducted in accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP) during all intrusive investigation. Based on requirements specified in the NYSDOH CAMP, the perimeter air monitoring program will consist of real-time perimeter measurements for total VOCs and respirable airborne dust particulates (particulate matter less than 10 microns – PM_{10}). The data will be saved in the dataloggers attached to the instruments.

CHAPTER 8
HEAT AND COLD STRESS

8.1. HEAT STRESS

The potential for heat stress is high for this project because the fieldwork will be conducted mostly during the summer months. Therefore, extra care must be taken to observe and respond to symptoms. Sweating does not cool the body unless the sweat is evaporated from the body. The use of some PPE can reduce the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's effort to maintain an acceptable temperature may become impaired and this may cause heat stress. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks. If semi-permeable and impermeable PPE is used at the site, heat stress is a MAJOR HAZARD.

8.1.1. Types of Heat Stress

8.1.1.1. Heat stress related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. Heat rash occurs because sweat is not evaporating, making the skin wet most of the time. Standing erect and immobile allows blood to pool in the lower extremities. As a result, blood does not return to the heart to be pumped back to the brain and fainting may occur. Heat cramps are painful spasms of the muscles due to excessive salt loss resulting from profuse sweating. Heat exhaustion occurs because of the large fluid and salt loss from profuse sweating.

8.1.1.2. Heat stroke occurs when the body's temperature regulatory system has failed. Skin is hot, dry, red, and spotted. These skin color changes may not be readily evident in darker skinned individuals and other signs must be relied upon. The affected person may be mentally confused, delirious, and convulsions may occur. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area immediately. The person should be soaked with water and fanned to promote evaporation. Medical attention must be obtained immediately. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.

8.1.2. Early symptoms of Heat Stress Related Problems

Personnel should recognize the early symptoms of heat stress. These symptoms include:

- Reduced performance;
- Lack of coordination;
- Lack of alertness;
- Unsteady walk;
- Excessive fatigue;
- Muscle cramps; or

- Dizziness.

8.1.3. Administrative Controls

Wet bulb globe temperature (WBGT) monitoring will be performed by the SSHO when temperatures on-site exceed 75°F.

8.1.4. Work/Rest Regimen

8.1.4.1. The management of risk for heat stress exposures centers around the principal of job-specific controls. Controls that will be implemented to reduce the potential for heat stress includes: use of acclimated personnel, providing adequate replacement fluid, educating individuals to recognize the early symptoms of heat stress, use of cooling vest, physiological monitoring, and development of a work/rest schedule that will prevent the onset of heat stress.

8.1.4.2. Work/rest regimens will be implemented in accordance with the limits specified in Table D1-8.1 for Level D PPE.

Table D1-8.1
Permissible Heat Exposure Threshold Limit Values [°C and (°F) WBGT]
when Level D PPE is Worn

Work/Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	31 (88)	28 (82)	------
75% Work 25% Rest, each hour	31 (88)	29 (84)	27.5 (81)
50% Work 50% Rest, each hour	32 (90)	30 (86)	29 (84)
25% Work 75% Rest, each hour	32.5 (90)	31.5 (89)	30.5 (87)

NOTE: The workload category may be established by ranking each job into light, medium, or heavy categories on the basis of type of operation:

Light: (up to 200 kcal/hr or 800 Btu/hr): e.g., sitting or standing to control machines, performing light hand or arm work.

Moderate: (200-350 kcal/hr or 800-1400 Btu/hr): e.g., walking about with moderate lifting and pushing.

Heavy: (350-500 kcal/hr or 1400-2000 Btu/hr): e.g., pick and shovel work.

8.1.4.3. Work schedules may be adjusted in accordance with physiological monitoring results.

8.1.4.4. If at the end of a work period, the core body temperature for any team member exceeds 38°C (100.4°F), then the next lower work/rest regimen will be instituted.

8.1.4.5. If no team member's core body temperature exceeds 37.5°C (99.5°F), then the next higher work/rest regimen may be instituted.

8.1.4.6. A WBGT monitor may be used to monitor for conditions that pose a threat of heat stress. WBGT monitoring should be conducted by the SSHO/SUXOS when workers are dressed in Level D ensembles and the ambient temperature exceeds 75°F. Once the WBGT has been determined, the SSHO/SUXOS can estimate workers' metabolic heat load using Table D1-8.1 to determine the appropriate work/rest regimen. Modification to the work/rest schedule can be instituted by the SSHO/SUXOS based on physiological monitoring data.

8.1.4.7. Whenever a new team member begins work on-site, that member's entire team will use the appropriate table for establishing the work/rest regimen until the new team member is acclimated.

8.1.4.8. Use of cooling vests by team members may also modify the work/rest regimen or the time of stay for continuous work. In this event, work/rest regimens will be modified as described in Paragraphs 8.1.4.3 through 8.1.4.6.

8.1.5. Prevention of Heat Stress

Proper training and preventive measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illnesses. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
  - Modify work/rest schedules as described above.
  - Mandate work slowdowns as needed.
- Perform work during cooler hours of the day, if possible.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Ensure workers are acclimated to weather conditions and have extensive experience in the selected level of PPE. Workers can be acclimatized by gradually increasing the workload over a period of days.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluids intake must approximately equal the amount of water lost in sweat, e.g., 8 fluid ounces (0.23 liters) of water must be ingested for approximately every 8 ounces (0.23 kg) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
  - Maintain water temperature at 50° to 60°F (10° to 16.6°C).
  - Provide small disposable cups that hold about 4 ounces (0.1 liter).
  - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or diluted drinks) before beginning work.
  - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.

- Train workers to recognize the symptoms of heat-related illnesses.
- Provide potassium supplements (banana or potassium chloride tablets).
- Rotate personnel and alternate job functions.

8.2. COLD-RELATED ILLNESS

8.2.1. General

8.2.1.1. Exposure to low temperatures presents a risk to employee safety and health both through the direct effect of the low temperature on the body and collateral effects such as slipping on ice, decreased dexterity, and reduced dependability of equipment. Work conducted in the winter months can become a hazard for field personnel due to cold exposure. All personnel must exercise increased care when working in cold environments to prevent accidents that may result from the cold. The effects of cold exposure include frostbite and hypothermia. Wind increases the impact of cold on a person's body. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally labeled frostbite. Recognition of the symptoms of cold-related illness will be discussed during the health and safety briefing conducted prior to the onset of site activities.

8.2.1.2. Hypothermia is a life-threatening condition in which the core body temperature falls below 95°F. Hypothermia can occur at temperatures above freezing particularly when the skin or clothing becomes wet. During exposure to cold, maximum shivering occurs when the core temperature falls to 95°F. As hypothermia progresses, depression of the central nervous system becomes increasingly more severe (Table D1-8.2). This accounts for the progressive signs and symptoms ranging from sluggishness and slurred speech to disorientation and eventually unconsciousness.

Table D1-8.2
Progressive Clinical Symptoms of Hypothermia

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

8.2.1.3. Frostbite is both the general and medical term given to areas of cold injury. Unlike hypothermia, frostbite rarely occurs unless environmental temperatures are less than freezing and usually less than 20°F. Frostbite injuries occur most commonly on the distal parts of the body (nose, earlobes, hands, and feet) that are subject to intense vasoconstriction. The three general categories of frostbite are:

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

8.2.2. Preventing Cold Exposure

In preventing cold stress, the SSHO must consider factors relating to both the worker and the environment. Training, medical screening, establishment of administrative controls, selecting proper work clothing, and wind-chill monitoring all contribute to the prevention of hypothermia and frostbite.

- **Training** - Recognizing the early signs and symptoms of cold stress can help prevent serious injury. Therefore, workers will be trained to recognize the symptoms of hypothermia and frostbite and have appropriate first-aid instruction. When the air temperature is be low 50 °F, the SSHO will inform workers of the proper clothing requirements and any work practices that are in effect to reduce cold exposure.
- **Administrative Controls** - The SSHO will establish a work/rest schedule based upon worker monitoring. At the first sign of uncontrollable shivering the worker will be rested in a heated shelter. Work will stop when the air temperature reaches 0°F.
- **Clothing** - Workers will be encouraged to layer clothing when air temperature is below 50°F. Clothing that has a high insulation value will be worn under protective garments. Insulated gloves will be worn when the wind chill index is below 32°F.

CHAPTER 9
STANDARD OPERATING PROCEDURES

9.1. INTRODUCTION

Standard safety practices, as presented in Section 11 of the Generic Site-Wide Health and Safety Plan and summarized in this section, shall be employed while the work is conducted. These work practices shall include the proper use of specified PPE and tools, proper decontamination procedures, and careful work around and continuous inspection of all physical hazards. Good housekeeping, including keeping the work area neat on a daily basis, shall be done to reduce risk from physical hazard. A "buddy system" shall be employed at all times.

CHAPTER 10
PUBLIC SAFETY AND SITE CONTROL MEASURES

10.1. INTRODUCTION

Refer to the site layout and control measures described in Section 12 of the Generic Site Wide HASP which will be implemented under this HASP.

CHAPTER 11
SITE CONTROL MEASURES

11.1. WORK ZONES

11.1.1. The purpose of establishing work zones and maintaining site control is to minimize potential contamination of workers, protect the public, and prevent unauthorized entry to work areas. Site control involves the physical arrangement of, and controlling access into, established work zones. Additionally, PPE requirements are specified for each work zone. At the OD Grounds, work zones will be established for all activities involving intrusive operations.

11.1.2. Zones will be delineated to aid in controlling the flow of personnel and equipment. The establishment of these work zones will help to ensure that personnel are properly protected against the potential hazards present where they are working, that work activities and contamination are confined to the immediate area, and that personnel can be located and evacuated in an emergency.

11.1.3. The general work zones designated for OD Grounds are the EZ and the Support Zone (SZ), and are described in greater detail below. The actual boundaries of the work zones for each step will be specified in the work plan.

11.2. EXCLUSION ZONE

11.2.1. The EZ is the work area where intrusive activities take place and where MPPEH/MEC contamination does or could occur. The EZ boundary will be defined by physical and geographic boundaries. All site personnel will be properly trained in controlling and minimizing access to the EZ.

11.2.2. Should an unauthorized person enter the EZ, work will be stopped and the unauthorized person will be escorted out of the EZ. Following any unauthorized entry of the EZ, the event will be recorded in the field logbook and site control measures will be reevaluated immediately with regard to preventing future unauthorized intrusions.

11.3. CONTAMINATION REDUCTION ZONE

The CRZ is the transition area between the EZ and the SZ. Since no contamination is expected at the site, the CRZ is not applicable. This zone typically provides an area to prevent or reduce the transfer of hazardous materials that may have contaminated personnel or equipment leaving the EZ.

11.4. SUPPORT ZONE

11.4.1. The SZ is considered to be a clean area and will be located at sufficient distance from intrusive activities to ensure the safety of SZ personnel.

11.4.2. The SZ contains the CP and other support supplies. Level D PPE is the appropriate apparel within this zone. In the event that site activities are being conducted during

cold weather, safety equipment susceptible to freezing (such as eye wash and decontamination solutions) will be stored in a heated space.

CHAPTER 12
PERSONAL HYGIENE AND DECONTAMINATION

12.1. INTRODUCTION

The decontamination procedures described in Sections 13 and 14 of the Generic Site Wide HASP shall be implemented under this HASP. The decontamination procedures associated with the intrusive tasks are summarized below:

12.1.1. Personnel Decontamination:

1. Equipment drop
2. Removal and disposal of non-reusable protective clothing/equipment (e.g., surgical gloves)
3. Removal of safety glasses and hardhat
4. Washing hands and face

12.1.2. Disposal Method:

1. No heavy contamination of clothing is expected and disposable protective clothing/equipment will be disposed of as non-hazardous waste. This material will be disposed of in a garbage bag for site trash pickup.
2. Any decontamination fluids (i.e., detergent and water solutions, and rinse water) will be captured, containerized and held on site. Spoils and metallic debris generated and recovered during the intrusive investigation of anomalies/targets under this task will be collected in roll-off containers for later disposal.

12.2. GENERAL SANITATION

The sanitation provisions specified in Section 2 of EM 385-1-1 will be established and maintained on-site as outlined in the following paragraphs. Eating, drinking, smoking, chewing, and application of cosmetics will be restricted to the SZ. The policies and procedures described in Sections 11.2 Generic Site Wide HASP for sanitation shall be employed while work is being conducted under this HASP.

12.2.1. Drinking Water

Cool, potable drinking water will be provided in sanitary, portable containers at all sites. Where necessary, disposable cups will also be provided and used to drink from the drinking water containers.

12.2.2. Toilet Facilities

Toilet facilities will be provided in accordance with EM 385-1-1, par. 02.E.

12.2.3. Hand-Washing Facilities

Hand-washing facilities or cleaning wipes will be provided in the portable toilet facilities and cleaning wipes will be provided in the crew break area. Field team personnel will wash their hands prior to eating or drinking and prior to leaving a site.

12.2.4. Designated Smoking Areas

Smoking will only be permitted in specific areas designated by the SSHO.

CHAPTER 13
EQUIPMENT DECONTAMINATION

13.1. EQUIPMENT AND TOOL DECONTAMINATION

Tool decontamination will consist of pressure washing followed by steam cleaning at a centralized location. Soap and water washes will be performed when required for sampling or for heavy contamination. Gross contamination, such as caked mud and dirt on the drill rig will be removed at the work site and placed back in the excavation location.

CHAPTER 14
EMERGENCY EQUIPMENT AND FIRST AID

14.1. INTRODUCTION

Each field crew will have at the work site the following emergency equipment

- First Aid Kit;
- Fire Extinguisher (A, B, C Type);
- Hand-Held Eyewash;
- Air Horn;
- Bolt Cutters (to cut exit gate chains);
- Latex Gloves;
- A CPR Mask; and
- A copy of the HASP which includes the emergency exits and hospital locations.

14.2. SPILL CONTROL MATERIALS EQUIPMENT

14.2.1 Chemical spills are not expected to be a problem at the Depot site. The only chemicals being brought into the site would be fuels and oils for equipment that would be used on the site. This will be brought onto the site in small quantity containers in the amounts needed for that day's operations. If a spill should occur while performing fueling on equipment, the spill would be a small quantity (under a gallon) and it would be cleaned up immediately. Small spill response kits (e.g., paper towel, diaper, etc.) will be on-hand to assist in the clean up. The spill and contaminated soil would be containerized and labeled, properly manifested, and shipped to an approved hazardous waste facility.

14.2.2 If a task involves bringing large quantities of a chemical onsite, a map showing chemical storage locations and a MSDS for each chemical will be included with the HASP.

CHAPTER 15
EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

15.1. INTRODUCTION

The Emergency Response and Contingency Procedures (ERCP) described in Section 16 of the Generic Site Wide HASP shall be implemented under this HASP. A summary of the ERCP is provided below:

- If work team observes hazards for which they are not prepared, they will withdraw from the area and call the PHSO. No team member will perform work at the site unless accompanied by another person.
- The SSHO is the primary authority for directing operations at the site under emergency conditions. All communications both on and off site will be directed through the SSHO or designee. For on-site activities when another Contractor is present, the SSHO or designee will coordinate and communicate with the designated SSHO or designee for the Contractor.
- If site conditions warrant evacuation, on-site staff will report to the Parsons Field office in Building 123. All personnel will retreat to an upwind or off-site location and communicate site conditions to the SSHO, the Parsons Project Manager, the USACE Project Manager, and other appropriate authorities as conditions warrant.
- Any personnel injured on site will be rendered first aid as appropriate and transported to competent medical facilities for further examination and/or treatment, as required. The preferred method of transport will be through a professional emergency transportation means, however, when this is not readily available or would result in excessive delays, other transport will be authorized. Under no circumstances will injured persons transport themselves to the hospital or doctors. ENG Form 3394 (Appendix F of the work plan) will be filled out by the SSHO and submitted to the Parsons PSHM will be prepared and submitted for each occurrence of an accident/incident.

All incidents must be verbally reported immediately to the client and the Program Health and Safety Officer.

15.2. EMERGENCY TELEPHONE NUMBERS

Emergency telephone numbers for medical and chemical emergencies are given in Emergency contact numbers are provided in Table D-9.1, Chapter 9 – Medical Support, of the APP. These numbers will be displayed prominently near each site phone.

15.3. DIRECTIONS TO MEDICAL FACILITIES

Phone numbers for emergency personnel are posted at the jobsite. The nearest occupational clinic is Life Care Medical Associates in Seneca Falls, New York. The nearest hospital is

Geneva Hospital. Driving directions to both facilities are included in Figure D-9.1 through Figure D-9.8 of the APP Life threatening, medical emergencies, and after-hours at clinic will be sent to the hospital for treatment. Otherwise, a work related injury which is not a medical emergency; it is *preferable* that injured personnel go to the industrial clinic (e.g., Life Care Medical Associates).

15.4. MEC CONTINGENCY PLAN

15.4.1. Introduction

This contingency plan defines the procedures that will be followed in the event that potential MEC items are encountered during intrusive activities in order to ensure the safety and the protection of the public and workers, and to ensure the proper disposal of discovered MEC items.

15.4.2. Initial Reconnaissance

If a suspect MEC item is encountered, the excavation team will perform an initial reconnaissance. If an item is suspected to be MEC, the UXO team will assess the suspect MEC using their knowledge and publications.

15.4.3. MEC Assessment

15.4.3.1 If the item is a potential MEC item, qualified UXO technicians will perform the assessment. X-Ray equipment will be used to confirm if the item is MEC.

NOTE: IN THE EVENT THAT A MEC ITEM RECOVERED DURING AN INVESTIGATION IS DETERMINED TO BE INCONSISTENT WITH THE MGFD STATED IN THE WORK PLAN, WORK WILL CEASE AND THE SITE-SPECIFIC MGFD WILL BE REEVALUATED. IF THE MGFD IS REVISED TO A GREATER HAZARD, THE RELATED MSD WILL BE RECALCULATED IN ACCORDANCE WITH DDESB TP 16 AND THE NEW MSD WILL BE IN EFFECT FOR THE REMAINDER OF THE INVESTIGATION. THE REVISED MGFD AND MSD WILL BE APPROVED BY USAESCH PRIOR TO IMPLEMENTATION. AN AMENDMENT TO THE ESP WILL BE PREPARED AND SUBMITTED FOR APPROVAL.

15.4.3.2 If the item is confirmed to pose an explosive hazard, the following steps will be taken:

- The SSHO, OESS, and SM will be notified immediately.
- If the item is fuzed and fired/armed, necessary arrangements will be made for its disposal.
- Work will stop and appropriate safety precautions, in conjunction with engineering controls, will be selected. These measures will be applied only after review and approval by the on-site OESS.
- The area will be secured until disposal of the item is performed.

CHAPTER 16
EMERGENCY RESPONSE TEAM

16.1. EMERGENCY RESPONSE TEAM

16.1.1. If an emergency develops on site, the procedures delineated herein are immediately followed. Emergency conditions exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure;
- A condition occurs that is more hazardous than anticipated; and/or
- Fires, explosions, structural collapses/failures, and/or unusual weather conditions (thunderstorms, lightning, high winds, etc.) occur.

16.1.2. If an emergency occurs, direct voice communication is used to sound the alarm. If personnel are out of range of direct voice communication, an air horn meeting the requirements of 29 CFR §1910.165 is sounded. General emergency procedures and specific procedures for personal injury are described within this section. Table D-9.1 in the APP has a list of emergency contacts. Additional project-specific phone numbers is provided in the HSP. Directions to the nearest medical facilities (Geneva General Hospital) are included in the APP.

16.1.3. In case of emergency, SSHO will implement the site emergency procedures. The following procedures will be followed:

- Notify the contact listed in Table D-9.1 in the APP when an emergency occurs. This list is posted prominently at the site.
- Use the "buddy" system (pairs).
- Maintain visual contact between "pairs." Each team member remains close to the other to assist in case of emergencies.
- If any member of the field crew experiences any adverse effects or symptoms of exposure, the entire field crew will immediately halt work and act according to the instructions provided by the Site Manager.
- Any condition that suggests a situation more hazardous than anticipated will result in evacuating the field team and re-evaluating the hazard and the level of protection required.
- If an accident occurs, the Site Manager or SSHO is to complete an accident investigation and submit the required paperwork. Refer to Section 16.9 for additional accident reporting guidelines.
- Follow-up action will be taken to correct the situation that caused the accident.

16.1.4. The SSHO is specifically responsible for the following:

- Implementing the site ERCP, including ordering site evacuations, coordinating fire-fighting efforts, and directing spill control and cleanup.
- Supervising site evacuation.
- Contacting emergency services such as the fire department, ambulance and security services, as may be required.
- Assisting in providing first aid services and medical support or evacuation for injured or exposed personnel.
- Determining the cause of the incident and ways to prevent future occurrences.
- Preparing a written incident or near-miss report for submission to the Parsons and USAESCH Project Managers.

16.1.5. On-site personnel are responsible for reporting emergencies or conditions immediately to their supervisors, alerting other employees; helping injured personnel, and assisting as directed to mitigate the incident.

16.2. ALL ON-SITE PERSONNEL

A clear chain-of-command in emergency situations ensures clear and consistent communication between site personnel and, therefore, results in more effective response to the emergency situation. The duties of site personnel in emergency situations are outlined below:

- The Site Manager will direct all emergency response operations, designate duties to other site personnel, and serve as liaison with government officials and emergency response teams.
- The Site Health and Safety Officer will make initial contact with off-site emergency response teams (first aid, fire, police, etc.), make recommendations on work stoppage, and provide for on-site first aid and rescue.
- The Field Office Supervisor will be designated when no one is performing this function during normal site work. This person will maintain contact with off-site response teams and notify additional agencies or offices that need to be contacted.
- Decontamination personnel will stand by to perform emergency decontamination. Decontamination personnel will also assist the safety officer in rescue operations when necessary.
- Field personnel will assist in rescue operations or take over for decontamination personnel when they are required for other duties.

16.3. EMERGENCY TRAINING

Prior to initiating the intrusive operations, Team Training will occur under the direction of the SSHO/SUXOS and PSHO. This will include the following:

- Hazard communication; and
- Emergency procedures.

CHAPTER 17
CONFINED SPACE ENTRY

Confined space entry is not anticipated to be required during any of the activities conducted during the munitions response actions at the SEDA OD Grounds.

CHAPTER 18
LOGS, REPORTS, AND RECORDKEEPING

18.1. LOGBOOK

The SSHO will keep a log recording all of the following aspects related to safety at the site.

- Training (initial site specific training, daily tailgate safety briefings, etc).
- Daily inspections.
- Site visitors.
- Issues or problems encountered.
- Accidents.
- Emergencies.

18.2. SAFETY AND TRAINING LOGS

The SSHO will prepare a report each week that is forwarded to the PSHO and USAESCH. This report will describe and summarize the following for the completed week:

- Date and recorder of log;
- Safety briefings (time conducted, material discussed, etc.);
- Weather conditions;
- Significant site events relating to safety;
- Heat stress monitoring data
- Accidents;
- Stop work events related to safety;
- Safety audits; and
- Signature of the Site Manager indicating concurrence.

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

- Date and recorder of log;
- Nature of training (personnel will complete the appropriate documentation of training form);
- Three days of supervised work (for new employees);
- Visitor training; and
- Signature of both the PM and SSHO indicating concurrence.

18.3. RECORDKEEPING

18.3.1 The SSHO will establish and maintain a filing system on-site for Health and Safety records, reports, and information concerning individual training, medical surveillance, etc. Sections in this filing system will include:

- Training Records -- Certificates for training required by 29 CFR§1910.120 (40-hour initial HAZWOPER, 8-hr refresher, and supervisory training) will be maintained at the site. Additionally, documentation of three days work under supervision, CPR, First Aid, and DoD ordnance training will be available at the site.
- Medical Monitoring -- Documentation of current enrollment (within last 12 months) in a medical monitoring program will be available for each employee working at the site. Documentation will consist of the employee's Health Status Report that is written and signed by the examining physician.
- Accident Reports -- Copies of any accident/incident reports and follow-up reports.
- Plan Acceptance Forms -- Copies of the Plan Acceptance Forms documenting that employees have read and understand the HSP will be maintained at the site.

18.3.2 Documentation of personnel credentials, site activities, and environmental monitoring will be maintained on-site. The SSHO will maintain and update these records. Documentation, at a minimum, shall include:

- Certificates for the following:
  - Initial 40-hour Hazardous Waste Operations and Emergency Response Training.
  - Applicable annual 8-hour refresher health and safety training.
  - Applicable 8-hour supervisory Hazardous Waste Operations and Emergency Response Training.
  - On-the-job training, 3-day.
  - First Aid and CPR.
  - DoD Explosive Training.
- OSHA Job Safety and Health Protection Poster: A copy of this poster shall be hung in the field office or in an area where employees routinely congregate.
- The OSHA 300 log: This log contains the required information for recording on-site injuries and illnesses, and must be generated by each company safety contact. A copy shall be maintained on-site and posted during the month of February.
- Site sign-in sheet: This record shall contain the date, name of each individual on-site, the employer, and the time entering and leaving the site. All personnel will sign this form.
- Accident/incident/near miss reports: All accidents, safety/health incidents, and near misses shall be investigated, and investigation reports shall be maintained at the site.
- A Site Health and Safety Plan Acknowledgment form containing the date, names of the individuals, the employer, and the individuals' signature.
- The initial site-specific health and safety training record containing the date, the individuals' names and signatures, and the company they are representing.
- The Safety Meeting Record containing the date, topic discussed, individuals' names and signatures, and the company they are representing.
- Safety problem/observations: These records: 1) document unsafe behavior and initiate disciplinary action, and 2) document exemplary safety behavior.

- The health and safety inspection log completed daily to verify that site conditions and activities are in compliance with the HSP. Deficiencies will be noted and changes made immediately.
- The safety and health program plan required under 29 CFR §1910.120(b).

18.3.3 All records related to the project will be kept in the project files onsite for the duration of field activities. Upon completion of all field tasks, all records will be maintained in the Parsons Boston office.

ATTACHMENT 2

ACTIVITY HAZARD ANALYSES

Activity Hazard Analysis (AHA)

Activity/Work Task: **DEMOLITION OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include:			
a. Establish Work Area Control Zones in a Conventional MEC/UXO Environment	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	L
b. Mechanical Excavation	1b.Biological hazards.	1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area.	L
c. Disposal Operations			
d. Post Blast Check of Demolition Area			

Job Steps	Hazards	Controls	RAC
		1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin.) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and	L L

Job Steps	Hazards	Controls	RAC
		the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided	L
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished. Demolition Crew will use nitrile gloves when handling bulk explosives.	L
	1f. MEC/UXO Hazards	1f. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1g. Lifting hazards.	1g. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back	L

Job Steps	Hazards	Controls	RAC
		as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	
	1h. Hand and Power tool operation	1h. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L
	1i. Vehicle and heavy equipment traffic in area.	1i. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1j. Pinch and cut hazard from handling sharp scrap material.	1j. Wear all required PPE, ensure that it is serviceable, and check hand placement to ensure there are no sharp surfaces or pinch areas.	L
	1k. Unintentional Detonation	1k. Establish clear and defined work zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All demolition operation will be conducted IAW TM60A1-1-31. All MEC/UXO work ceases when unauthorized personnel enter into the MSD.	M
	1l. Noise in excess of OSHA standards	1l. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L

Job Steps	Hazards	Controls	RAC
	1m. Underground Utilities	1m. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence.	L
	1n. Fire/Explosion	1n. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 9. Proper fire extinguishers will be on site and serviceable. There will be no "Hot Fueling" authorized at any time.	L
	1o. Confined Space – Cave In/Entrapment	1o. Any excavation deeper than 4ft is classified as a confined space (non-permit required). Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. Engineering controls are Sloping, Benching and Shoring. No work will be allowed in an excavation that has standing water. The water will be pumped out and re-entry will only be allowed after the Competent Person inspects the excavation site. Egress points are placed no further than 25ft from any workers. If ladders are used, they must: a. Extend from the floor surface of the excavation and extend a minimum of 3ft beyond above ground level of the excavation b. Be clear of all equipment and engineering controls for workers to use c. Upon entry into the excavation, be OSHA rated and support the worker's weight to include tools and equipment	L
	1p. Misfires	1p. Misfires will be handled, as prescribed in TM60A-1-1-31, Explosive Ordnance Disposal Procedures.	L
	1q. Severe Weather (Lightning, Winds, Snow)	1q. No demolitions operations will be conducted during the on-set of severe weather (strong winds above 25mph; lightning, d snow and other visibility reducing events).	L
	1r. Low flying aircraft	1r. UXOSO or Demolition Team Leader will prepare and telephonically submit a NOTAM (Notice to Airmen) through the servicing Federal Aviation Administration Office during the	L

Job Steps	Hazards	Controls	RAC
		entire Demolition Operation. Above Ground Limit (AGL or Ceiling Limitations) requirements for the NOTAM will be based on calculations from 1q below.	
	1s. Hazardous Fragmentation	1s. Demolition Crew will adhere to HNC-ED-CS-S-98-7, August 1998, and Amendment 1, February 2011, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions to reduce the fragmentation hazards and establish the HFD as listed in DDESB TP16 or USACE Fragmentation Data Sheet for items being destroyed.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Demolition Material sufficient to complete the operation b. Galvometer c. Firing Device d. Sandbags 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. Competent Person (UXOSO) for Soils. 6. UXO Tech III, serving as a Licensed Blaster, if required by state. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **DIGITAL GEOPHYSICAL MAPPING (DGM)**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Set Up and Calibrate equipment prior to use	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	L
	1b.Biological hazards.	1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area.	L

Job Steps	Hazards	Controls	RAC
		1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and Any other protective measures deemed appropriate cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate.	L

Job Steps	Hazards	Controls	RAC
		1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin.) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water.	L
		1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings. Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided.	L

Job Steps	Hazards	Controls	RAC
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	L
	1d. Pinch hazard from assembly and placement of equipment.	1d. Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands.	L
	1e. Lifting hazards.	1e. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1f. Cold/Heat Stress	1f. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1g. Battery Fire/Explosion	1g. Battery Charging operations will be conducted IAW EM 385-1-1, Chapter 11. Appropriate PPE will be worn. Site vehicle battery will not be used as a back-up for this operation, because it may damage the system and strand field crew.	L
	1h. Vehicle and heavy equipment traffic in area.	1h. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment.	L
	1i. Use of hand and power tools	1i. Use the proper tools for the specific job being performed. Be certain that the tools to be used are serviceable and free of slippery surfaces. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L

Job Steps	Hazards	Controls	RAC
2. Locate anomalies and sample points	2. The Hazards listed in Hazard 1 are applicable to Hazard 2 with the exception of 1g and 1h.	2. The Controls that are listed in Controls 1 are applicable to Controls 2 with the exception of 1g and 1h.	L
3. Gather geophysical data on subsurface anomalies by carrying/pushing instruments	3. The Hazards listed in Hazards 1 and 2 and applicable to Hazard 3.	3. The Controls that are itemized in Controls 1 and 2 are applicable to Controls 3.	L
4. Use of any motorized vehicle to tow DGM equipment, to include: a. Pre-operational; During and After Checks b. Safe Normal Vehicle Operations c. Perform Operator Level Maintenance	4. The Hazards listed in Hazards 1, 2, and 3 are applicable to Hazard 4. In addition hazard 4b; 4c; 4d; 4e; 4e and 4g has been added.	4. The Controls that are itemized in Controls 1, 2, and 3 are applicable to Controls 4. 4d is changed as follows	L
	4a. Pinch and cut hazard	4a. Operators will use good and serviceable leather gloves when performing service checks. Potential pinch and cut hazards when performing vehicle inspections inside the engine compartment; around doors; latches and lift gates.	L
	4b. Contact with chemical agent or other hazardous chemicals	4b. Refer to Vehicle, Heavy Equipment, ATV and Battery Operated Equipment AHA.	L
	4c. Inclement Weather (Winds; Snow; Ice and Dust)	4c. Refer to Vehicle, Heavy Equipment, ATV and Battery Operated Equipment AHA.	L
	4d. Fire/Explosion	4d. Refer to Vehicle, Heavy Equipment, ATV and Battery Operated Equipment AHA.	L
	4e. Towing Hazards	4e. Refer to Vehicle, Heavy Equipment, ATV and Battery Operated Equipment AHA.	L
	4f. Failure of Integral Safety Equipment	4f. Refer to Vehicle, Heavy Equipment, ATV and Battery Operated Equipment AHA.	L
	4g. ATV/Segway Hazards	4g. Refer to Vehicle, Heavy Equipment, ATV and Battery Operated Equipment AHA.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. GPS Total Station and GPS Rover 2. Geophysical instrument 3. Hand and Power Tools 4. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone 8. Battery and Battery Charger	<u>Qualified Personnel</u> 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Trained Geophysical Equipment Operator 4. Trained GPS Operator 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 6. All personnel operating any motorized equipment, to include ATVs or Segways will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. <u>Training</u> 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	<u>1. Initial (Site Selection)</u> – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. <u>2. Daily</u>- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. <u>3. Weekly</u> – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. <u>4. Final (Site Departure)</u> – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate GPS Total Station and GPS Rover, Geophysical instruments, and hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **EMERGENCY RESCUE OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

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Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

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L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include: a. Establish Work Area Control Zones b. Assist with Personnel Decontamination c. Perform Rescue of Injured Down Range Member d. Perform Medical Monitoring of Injured Identification	1a. Slip, trip and fall. 1b.Biological hazards.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris. 1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area. 1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the	L

Job Steps	Hazards	Controls	RAC
		beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field	L L

Job Steps	Hazards	Controls	RAC
		crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided.	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	L
	1d. Vehicle and heavy equipment traffic in area.	1d. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1e. Lifting hazards.	1e. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1f. Cold/Heat Stress	1f. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1g. Contact with chemical agent or other hazardous chemicals.	1g. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished. Inherent with PDS operations, both the PDS	L

Job Steps	Hazards	Controls	RAC
		Tent and Monitoring Tent are needed to be maintained at temperatures greater than 68°F. Electrical floor heating units are prohibited in the PDS or Monitoring Tent. Portable propane heaters can be used, but these cause "off gassing" of carbon monoxide (CO^2). A CO^2 Meter capable of reading levels from 0 – 25ppm is required and will be periodically observed for current levels. If the level is reached or exceeded; the heating unit will be turned off; the PDS and Monitoring Tent will be opened and allow fresh air to ventilate through, until CO^2 level is below 25ppm.	
	1h. MEC/UXO Hazards	1h. If an MEC item is encountered, alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1i. Noise in excess of OSHA standards	1i. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1j. Fire/Explosion	1j. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no "Hot Fueling" authorized at any time.	L
	1k. Pressurized cylinders – sudden release of contents	1k. Periodic inspection of all pressurized cylinders by field crew. Proper storage of cylinders in accordance with SOPs. Some operations require the use of a Cascade System (multiple pressurized cylinders) to provide breathable air for downrange team. The valves, gauges and connections are needed to be visibly checked hourly while team is downrange.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Rescue litter and retrieval device 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 4. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 5. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Selected site personnel performing Rescue will be trained and practice Rescue procedures 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. All personnel involved in this operation that are required to wear Self-Contained Breathing Apparatus (SCBA) or a full-face Air Purifying Respirator (APR) will be certified under 29 CFR1910.134 Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assigned or designated area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate rescue litter and retrieval device.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **EXPLOSIVE STORAGE AND TRANSPORTATION (ESAT) OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	**Risk Assessment Code (RAC) Matrix**
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include: a. Establish Explosive Storage Area (ESA) b. Receipt/Store/Issue/ Inventory/Restock Explosive material	1a. Slip, trip and fall. 1b.Biological hazards.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris. 1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area. 1b. <u>Hazardous Plants</u> - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the	L L

Job Steps	Hazards	Controls	RAC
		beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin.) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field	L L

Job Steps	Hazards	Controls	RAC
		crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	L
	1f. Static Electricity (Grounding/Lightning Protection)	1f. The ESA bunker will be grounded IAW with the WP, SOP and DA Pam 385-64, Chapters 6 &12. Lightning protection for the ESA may be excluded as described in EM 1110-1-4009, Chapter 11. Electrical work and grounding to be performed by a certified electrician.	L
	1g. Fire/Explosion (Range Fires/ Unintentional Detonation/Compatibility of Explosives)	1g. Fire Protection Plan - The ESA area will require general and specific housekeeping on a routine basis to keep vegetation and flammable material maintained to a level that will not propagate the spread of a fire. All trash will be removed from the fencing around the ESA. The ESA will be protected by at least one 20A:BC fire extinguisher mounted on the outside of the ESA fence, near the entrance. All spark emitting devices, matches and flame producing items will not be carried into the ESA. These items will be left outside in a designated location. In the event of a fire at or near the ESA,	L

Job Steps	Hazards	Controls	RAC
		all site personnel will be evacuated to a distance outside the approved Inhibited Building Distance (IBD), as stated in the approved Explosive Siting Plan (ESP). An honest attempt to fight the fire will be made with all available fire-fighting equipment on hand. A reasonable decision will be made by the UXOSO when these means have been exhausted and any further attempts will endanger site personnel. At no time will anyone attempt to evacuate the explosives from the ESA; should the bunker door be open at the time, it will be shut and secured if time permits. The UXOSO will notify meet the responding local fire department at the IBD boundary and brief them on the following: • Total Quantity of Explosives, by hazard classification, inside the ESA; • Time the fire started; and • The amount of time the bunkers have been engulfed by flames. 1g. Unintentional Detonation - Establish clear and defined work areas/zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All MEC/UXO work ceases when unauthorized personnel enter into the work area. 1g. Explosive Compatibility - Explosive compatibility will be maintained in accordance with DA PAM 385-64; TM 9-1300-206; the ESP and SOP. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, a waiver will be requested IAW DOD 6055.09-M, and then a barricade, such as sandbags, within the magazine, will physically separate the incompatible items. 1h. Bunker Structure - Approved explosive storage facilities may be provided at the site, either by the U.S. Army Corps of Engineers (USACE) or by the installation. Parsons will use the existing magazines for explosive storage and comply with local storage criteria and procedures. If no explosives storage facilities are available, Parsons will: • Use approved BATF Type 2 structures; • Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DOD 6055.09-	L L L

Job Steps	Hazards	Controls	RAC
		M, DOD Ammunition and Explosives Safety Standards; • Install sufficient magazines to comply with the explosive compatibility requirements, (i.e., bulk explosives, initiating explosives); • Establish security, such as fencing, to prevent unauthorized access and/or theft, as required.	
	1h. ESP Structure and Security	1h. Security - Appropriate fencing; hinges and hasps; keys and locks; key control; signage and placards and inspections (physical security) protection will be installed on all site(s), in accordance with AR 190-11, paragraph 5-3, the ESP and SOP. An emergency notification list containing the names, telephone numbers, and local addresses of the individuals to be notified in the event of an emergency, will be posted on the outside and inside of the magazine door. These individuals should be the same individuals authorized to sign for explosives, as well as the site manager and UXOSO.	L
	1i. MEC/UXO Hazards	1i. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1j. Severe Weather (containing potential electrical charge)	1j. UXOSO will verify through local and national weather forecast agencies that an optimum time frame to complete all Explosive Storage and Transportation (ESAT) operations is in effect for the area. There will be no scheduled ESAT operations during weather conditions that pose static electrical charges, or minimize visibility.	L
	1k. Pinch and cut hazard from handling debris material.	1k. All UXO personnel will use good and serviceable leather gloves when handling potentially contaminated MPPEH/UXO and range-related debris.. Items have extremely sharp edges and surfaces that will cut and lacerate hands.	L
	1l. Vehicle and heavy equipment traffic in area.	1l. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom,	L

Job Steps	Hazards	Controls	RAC
		shovel, etc. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When transporting equipment by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. When attempting to hook onto the trailer, "ground guides" will not place any part of their body between the trailer and vehicle.	
	1m. Noise in excess of OSHA standards	1m. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1n. Lifting hazards.	1n. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
2. Transport Explosive from Storage Area to Disposal Site and return of un-used Explosives to include:	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2, with the exception of Hazard 2f; 2h; 2i and 2n. In addition hazard 2a and 2b are added.	2. The Controls itemized in Control 1 are also applicable to Control 2. 2a is changed as follows:	
a. Explosive Transportation Route	2a. Contact with chemical agent or other hazardous chemicals	2a. UXO Workers will don the nitrile gloves, as an inner and outer liner to the issued leather gloves, when handling raw and bulk explosives.	L
b. On Call Provider c. Project End Use Disposal	2b. Transportation of Explosives (Unintentional Detonation)	2b. <u>On Site</u> - UXOSO will develop an Explosive Transportation Route to ensure that non-essential personnel; buildings, roads and railways are not exposed to potential hazards, when transporting explosives from the ESA to the disposal site. Explosive Vehicle will be inspected and maintained IAW DA Pam 385-64, Chapter 7 and SOP. This will include: • One 20A:BC or two 10A:BC rated fire extinguishers (**<u>do not</u>** use the extinguisher located at the ESA); • Flame Retardant Tarpaulin to cover explosives;	L

Job Steps	Hazards	Controls	RAC
		• Approved Electro-Magnetic Radiation (EMR) container for initiators; • Appropriate Signage/Placards; and, • Non-conductive bed liner (plywood sheet) for transport vehicle	
		2b. Off Site - Certain or remote sites may have established the use of an "On-Call" explosives provider, as a sub-contractor, listed in the Explosive Management Plan (EMP). UXOSO will ensure that the provider transports, placards and conforms to the required Department of Transportation (DOT) regulations, prior to arrival on site. The "On Call" supplier will be briefed on the Explosive Transportation Route by the UXOSO. If the state requires a licensed Blaster, a site UXO Tech III will be licensed to serve in that capacity and sign receipt of all requested explosives from the "On Call" supplier. The "On Call" supplier will remain on site, but outside the Maximum Generated Fragmentation Distance (MGFD), until all disposal operations are completed.	L
	2c. Intentional Detonation	2c. The detonation team leader will maintain control of the initiating device i.e., blasting machine or blasting machine handle of Non EI initiator at all times. Non-essential personnel will be evacuated, access routes to the demolition site guarded, required entities notified. The demolition team will follow the Demolition SOP, and TM 60A-1-1-31.	M

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. One 20A:BC or two 10A:BC Fire Extinguishers for Explosives Transport Vehicle; b. Flame Retardant Tarpaulin to cover explosives; c. Non-conductive material (plywood lining) for transport vehicle; d. EMR-approved Container for initiators; 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. UXO Tech III, serving as a Licensed Blaster, if required by state. 6. Electrical work to be performed by a Certified Electrician. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone		

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **FUELING OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. General Fueling Operations	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris.	L
	1b.Biological hazards.	1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area.	L
		1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the beginning of each day;	L

Job Steps	Hazards	Controls	RAC
		• Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin.) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information	L L

Job Steps	Hazards	Controls	RAC
		Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	L
	1d. Fire/Explosion	1d. Smoking or open flames within 50 feet of where flammables are being used or transferred or where equipment is being fueled is prohibited. Each service or fueling area will have at least one 20-B:C rated fire extinguisher within 75 feet of each pump. Clearly identified and easily accessible Emergency Cut-Off switch(es) will be installed and clearly marked at a location remote from dispensing devices to shut off the power to all dispensing devices in an emergency. Equipment using flammable liquid fuel shall be shut down during refueling, servicing, or maintenance. Those vehicles or equipment without an internal grounding system will be bonded between the fueling system and themselves, prior to dispensing fuel.	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Operators need to be aware of potential exposure to corrosive and/or flammable liquids when conducting vehicle fueling. Operators will not eat, drink or smoke when performing these tasks. Any visible leaking will be immediately reported to their supervisor. Select appropriate PPE, based on task.	L
	1f. Vehicle and heavy equipment traffic in area.	1f. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment.	L
	1g. Pinch hazard from assembly and placement of equipment	1g. Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands for pinch areas as well.	L

Job Steps	Hazards	Controls	RAC
	1h. Cold/Heat Stress	1h. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. OSHA Approved Fuel Cans; Approved Fire Extinguishers; Bonding Strap; Funnels; Drip Pans, and Absorbent Material 2. Hand Tools 3. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 4. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 5. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to use OSHA approved fuel cans, Approved fire extinguishers, bonding straps, funnels, drip pans, and absorbent materials.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **GENERAL SITE CONSTRUCTION OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. General Operations, to include: a. Site Preparation b. Proper Tool Selection c. Equipment Load-Out	1a. Slip, trip and fall. 1b.Biological hazards.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris. 1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area. 1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream	L L L

Job Steps	Hazards	Controls	RAC
		(such as Ivy X©) to potentially exposed skin at the beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin.) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field	L L

Job Steps	Hazards	Controls	RAC
		crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided (**Note:** Snakes tend to seek the shade generated by vehicles. Operators need to be aware and take extra precautions when approaching, reaching under and entering vehicles in areas prone with snakes.)	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e.Inspect Tools for Proper Guards and Electrical Cords (Failure of Integral Safety Equipment)	1e. All portable power tools will be inspected, and maintained in accordance with manufacturer's instructions and recommendations, and will be only used for the purpose for which designed. Portable power tools will be inspected, tested, and determined to be in safe operating condition before use. Portable power tools will be in good repair and with all required safety devices installed and properly adjusted. Portable power tools having defects that will impair their strength or render them unsafe will be removed from service. Portable power tools with guards will be equipped with such guards; ensure guards are in place and operational at pinch and nip points and control loose clothing, gloves, jewelry and hair.	L

Job Steps	Hazards	Controls	RAC
2. General Construction, to include: a. Normal Operations	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2a, 2b, 2c, 2d; 2e; 2f; 2g; 2h; 2i; 2j; 2k; 2l and 2m are added.	2. The Controls itemized in Control 1 are also applicable to Control 2.	
b. Portable Ladders and Lifts c. Hoisting & Rigging	2a. Electrical Shock.	2a. Most electrical hand tools are battery operated and require recharging at the end of each day's operation and some require a supplied electrical source, such as a generator or "hard wired" connections. Electrical hook-ups and installation, if required, will be conducted by a certified electrician, local electrical company or equipment company. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse, then an electrician will be contacted to correct the problem. All electrical appliances, extension cords and equipment will have a third prong for proper grounding; all electrical outlets used on project sites will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	L
	2b. Airborne Dust/Particulates	2b. Project CIH will establish Respiratory Protection Plan; ensure local ventilation/engineering controls are in place. UXOSO will monitor exposure and area, if additional respiratory guidance is needed.	L
	2c. Eye/Foot and Hand Hazards	2c. Eye/Face Protection – Safety glasses with side shields (ANZI Z87.1); Appropriate footwear as required, but safety toed footwear may be required depending on task; Sturdy leather work gloves as required	L
	2d. Ergonomic Hazards	2d. Reduce bending, twisting, and kneeling, by using alternating work, rotating workers and periodic stretching break to reduce static or awkward postures. Use team lifting, and lifting aids to minimize lifting weights over 25-lbs above the shoulders, below the knees, or at arm length	L
	2e. Pinch and cut hazard from handling sharp scrap material.	2e. Operators will use good and serviceable leather gloves when performing service checks. Potential pinch and cut hazards when performing vehicle inspections inside the engine compartment; around doors; latches and lift gates.	L

Job Steps	Hazards	Controls	RAC
	2f. Falls from height	2f. Visually inspect ladders and lifts before use; select proper type; protect against exposure to moving traffic, equipment and access doorways; conduct good housekeeping around the top and base of the ladder, and always ensure proper placement, lashing or holding when on slippery surfaces. Use hoists/ropes to bring tools and equipment up to elevated work surfaces. Have someone hold ladder if it will provide more support. Use barricades or signs to warn of presence of ladder. Do not position ladder in front of closed door that can open into the ladder.	L
	2g. Power and Pneumatic Tools (All types)	2g. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13. Refer to Portable Hand Held Power Tools Activity Hazard Analysis (AHA).	L
	2h. Hoisting and Rigging of heavy equipment (Incorrect rigging practice resulting in load falling)	2h. Only use equipment and lift loads that are approved by Site Lift Plan (SLP) (Refer to Corporate Health and Safety Manual, Chapter 26). Obtain CIH approval before starting the rigging job. Do not alter any engineered lift or SLP. Keep within load limit of equipment and know the weight of your load. Inspect equipment (including slings, shackles, etc.) before use.	L
	2i. MEC/UXO Hazards	2i. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	2j. Noise in excess of OSHA standards	2j. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L

Job Steps	Hazards	Controls	RAC
	2k. Vehicle and heavy equipment traffic in area.	2k. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	2l. Towing Hazards	2l. When transporting tools and required equipment by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When attempting to hook onto the trailer, "ground guides" will not place any part of between the trailer and vehicle.	L
	2m. Pressurized cylinders – sudden release of contents; fire, explosion ; burns and asphyxiation	2m. Assign users/handlers who are trained in compressed gas safety; ensure pressure relief valves are in place; isolate from vehicular traffic; transport in a safe manner, and secure and store all gases, based on compatibility. Periodic inspection of all pressurized cylinders by operator. Proper storage of cylinders in accordance with SOPs.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Steel-toed boots, as directed i. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Compressed Gas Cylinders; b. Nail Guns; 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Personnel operating any powered tool will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **GENERATOR OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Generator Operations, to include: a. Pre-operational; During and After Checks b. Safe Normal Vehicle Operations c. Perform Operator Level Maintenance	1a. Slip, trip and fall. 1b.Biological hazards.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris. 1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area. 1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the	L L L

Job Steps	Hazards	Controls	RAC
		beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and	L L

Job Steps	Hazards	Controls	RAC
		poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided (**Note:** Snakes tend to seek the shade generated by vehicles. Operators need to be aware and take extra precautions when approaching, reaching under and entering vehicles in areas prone with snakes.)	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Operators need to be aware of potential exposure to corrosive and/or flammable liquids when conducting vehicle inspections. Operators will not eat, drink or smoke when performing these tasks. Any visible leaking will be immediately reported to their supervisor. Any spills of generator additives (anti-freeze, oil, hydraulic fluids, etc.) will be cleaned up immediately. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished. Equipment Operators will need to place a supplemental drip pan or catch basin underneath the engine and transfer cases at the end of the day.	L
	1f. Equipment Acceptance (Initial Inspection of equipment)	1f. Upon delivery of equipment, a competent person or the operator will inspect all aspects of the generator, to include – current copy of Operator's Manual and current Maximum Kilowatt output rating. During the inspection of the vehicle, if	L

Job Steps	Hazards	Controls	RAC
		the operator notices that any of the generator's integral safety equipment (circuit breaker, oil warning lights, etc.) is inoperable; that generator is no longer operational and cannot be used until repaired.	
	1g. Inclement Weather (Winds; Snow; Ice and Dust)	1g. Equipment operators need to be aware of procedures to safely operate generators in adverse weather conditions. This may include reducing wattage to maintain minimum power to conduct operations.	L
	1h. Electrical Shock.	1h. This equipment is used to produce ample and a constant electrical power for the project's needs, which is adequate to kill a person. Only authorized operators are allowed to open compartments, adjust electrical flow or check connections. Electrical hook-ups and installation, if required, will be conducted by a certified electrician. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse, then an electrician will be contacted to correct the problem. All generators will be grounded, prior to operations, IAW EM385-1-1, Chapter 11. Those generators that are equipped with an integral grounding system are exempt. All electrical appliances, extension cords or equipment being plugged into the generator will have a third prong for proper grounding and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections. All generators will be turned off or discharged, prior to servicing or refueling them.	L
	1i. Pinch and cut hazard from operating near sharp edges	1i. Operators will use good and serviceable leather gloves when performing service checks. Potential pinch and cut hazards when performing vehicle inspections inside the engine compartment; around doors; latches and lift gates.	L
	1j. Fire/Explosion	1j. Refueling of all generators will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 11. Proper fire extinguishers will be on site and serviceable. There will be no "Hot Fueling" authorized at any time. Those vehicles or equipment without an internal grounding system will be bonded between the fueling system and themselves, prior to dispensing fuel.	L

Job Steps	Hazards	Controls	RAC
	1k. Towing Hazards	1k. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When transporting Heavy Equipment by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. When attempting to hook onto the trailer, "ground guides" will not place any part of between the trailer and vehicle.	L
	1l. MEC/UXO Hazards	1l. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1m. Noise in excess of OSHA standards	1m. If the generators used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1n. Lock Out/Tag Out (Stored Energy Hazards)	1n. Any and all repairs to generators will be performed by a certified electrician. The generator will be shut down and all equipment shall be shut down and positive means taken to prevent its operation while repairs or maintenance is being done. No guard, safety appliance, or device shall be removed from machinery or equipment, or made ineffective except for making immediate repairs, lubrications, or adjustments, and then only after the power has been shut off. All guards and devices shall be replaced immediately after completion of repairs and adjustments, and before power is turned on. .	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Hearing Protection, as directed i. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Motorcycle Helmet, w/full face or goggles and gloves (ATV/Segway); 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Personnel authorized to operate generator equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. Certified Electrician. 6. Competent Person for Equipment Acceptance (normally an experienced operator). Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate generators.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **INVESTIGATION-DERIVED WASTE SAMPLING**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 2011 MAY 12	
Prepared by (Name/Title): Michael E. Short, Dir. Ops & Technology	
Reviewed by (Name/Title): Edward Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible.

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Setup / Preparation for sampling	1a. Injury incurred while using tools	1a.Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations. Inspections shall be performed prior to use by the tool operator to determine that the tool operating safely. Tools with defect shall be taken out of service until repaired.	L
	1b.Slip, trip, fall hazard	1b.Worker shall be aware of potential slippery surfaces and tripping hazards. Good housekeeping will be enforced by SSHO.	
	1c. Vehicle and heavy equipment traffic in work area	1c. Personnel shall be aware of any vehicles or heavy equipment in area and shall to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment.	

Job Steps	Hazards	Controls	RAC
	1d.High noise levels	1d.Appropriate hearing protection will be used when the noise level exceeds 85dBA. Noise levels will be either monitored using a sound level meter or if a team member cannot be heard by another team member, at normal voice level, within a distance of three feet then hearing protection must be worn.	L
	1e.Biological hazards	1e.Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate.	L
		1e. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts, gloves and long pants and head cover such as hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks	L

Job Steps	Hazards	Controls	RAC
		throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. <u>1e. Stinging/Biting Insects and Poisonous Snakes</u> - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. SSHO will brief field crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided.	L
	1f.Contact with chemical agent or other hazardous chemicals	1f.CA and HTW safety awareness will be conducted during site-specific orientation training and reviewed during morning tailgate briefings. Personnel will utilize a mod D or level D protective ensemble during set-up operations.	L

Job Steps	Hazards	Controls	RAC
	1g Pressurized Drums	1g.Before opening drums assess the appearance of the drum for bulging or other signs of internal pressurization. Workers can test pressures within a drum without opening by attempting to flex down on the lid of the drum or by listening for differences in tone produced by tapping on the drum. Pressurized drums will not be opened without the proper equipment.	L
	1h. Heat/cold stress	1h. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1i. Struck by Mechanized equipment	1i. If a forklift is used to move drums the operator must have received training in accordance with OSHA Standard 29 CFR 1910.178. Each day the forklift shall be checked by the operator to ensure equipment is in safe operating condition.	L
2. Sample Collection	2a. Contact with chemical agent or other hazardous chemicals	2a.CA and HTW safety awareness will be conducted during site specific orientation training and reviewed during morning tailgate briefings. PPE and protective clothing selection will comply with SSHP requirements. PPE and protective clothing requirements utilized during sampling is dependent upon waste characterization. If water being sampled was used to decon workers after ring-off than level C PPE may be warranted).	L
	2b. Slips, trips, and falls	2b. Worker shall be aware of potential slippery surfaces and tripping hazards. Good housekeeping will be enforced by SSHO.	L

Job Steps	Hazards	Controls	RAC
	2c. Injury incurred while handling tools	2c. Hand and power tools shall be used, inspected, and maintained in accordance with the manufacturer's instructions and recommendations. Inspections shall be performed prior to use by the tool operator to determine that the tool operating safely. Tools with defect shall be taken out of service until repaired.	L
	2d Heat/Cold stress	2d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves (set up) e. Butyl gloves (sampling) f. Safety Glasses, when required g. Hard Hat, when required h. Safety Vest, when required i. Steel-toed boots, as directed j. Additional PPE, as directed (CBRN APR, hearing protection , tychem F, butyl boots) 2. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 3. .Form of Communication a. Project or personal Cellular Phone 4.Hand tools (drum bung, wrench, drum dolly) 5. Possible use of forklift	Qualified Personnel 1. First Aid/CPR – SSHO and one other individual. 2. Training a. Site-specific WP, SOP and AHA b. OSHA 40 hour and applicable 8 hour c. Equipment operation (as applicable) d. Heat/Cold Stress e. Biological hazards f. Flora/Fauna endangered/threatened g. Daily safety and operational briefing h. Site visitor training (as applicable) I. HAZCOM J. supervisor training – SSHO k. 30-hr construction outreach (SSHO) l. Forklift operators must receive training as specified by 29 CFR1910.178	1. Initial (Site Selection) – Tools will be inspected prior to use by the operator in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly it will be disposed or turned in for repair/replacement. 2. Daily – Housekeeping of assembly and work areas for debris and hazards. SSHO will perform audits and spot checks to verify compliance. SSHO Escort will update site's MSDS files on all items, supplies and material brought onto site. If forklift used operator must inspect equipment daily to ensure operating safely. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **INTRUSIVE INVESTIGATIONS IN CONVENTIONAL/HTRW OPERATIONS, TO INCLUDE CONCRETE CORING**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include: a. Establish Work Area Control Zones in a Conventional MEC/UXO Environment b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification e. Disposal f. Munitions Debris Segregation	1a. Slip, trip and fall. 1b.Biological hazards.	1a. Worker awareness of potential slippery/uneven surfaces and tripping hazards plus inspection and policing of debris. 1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area. 1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of:	L L L

Job Steps	Hazards	Controls	RAC
		• Field personnel applying a protective barrier cream • (such as Ivy X©) to potentially exposed skin at the beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long	L L

Job Steps	Hazards	Controls	RAC
		pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished. The breathing zone will be continually monitored by the Photo Ionizing Detector (PID). During intrusive operations, excavations will be periodically monitored by passing the PID over the hole.	L
	1f. MEC/UXO Hazards	1f. Inspect the area for the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1g. Lifting hazards.	1g. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are	L

Job Steps	Hazards	Controls	RAC
		carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	
	1h. Hand and Power tool operation	1h. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L
	1i. Vehicle and heavy equipment traffic in area.	1i. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1j. Pinch and cut hazard from handling sharp scrap material.	1j. Wear all required PPE, ensure that it is serviceable, and check hand placement to ensure there are no sharp surfaces or pinch points.	L
	1k. Unintentional Detonation	1k. Establish clear and defined work areas/zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All MEC/UXO work ceases when unauthorized personnel enter into the work area.	M
	1l. Noise in excess of OSHA standards	1l. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1m. Underground Utilities	1m. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface	L

Job Steps	Hazards	Controls	RAC
		activities are allowed to commence.	
	1n. Fire/Explosion	1n. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no "Hot Fueling" authorized at any time.	L
	1o. Confined Space – Cave In/Entrapment	1o. Any excavation deeper than 4ft are classified as confined spaces (non-permit required). Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. Engineering controls are Sloping, Benching and Shoring. No work will be allowed in an excavation that has standing water. The water will be removed and re-entry will only be allowed after the Competent Person inspects the excavation site. Egress points are placed no further than 25ft from any workers. If ladders are used, they must – a. Extend from the floor surface of the excavation and extend a minimum of 3ft beyond surface level of the excavation b. Be clear of all equipment and engineering controls for workers to use c. Upon entry into the excavation, be OSHA rated and support the worker's weight to include tools and equipment	L
3. Conduct Operations in a HTRW Environment - a. Establish Work Area Control Zones b. Manual Excavation c. Mechanical Excavation d. Ordnance Identification e. Processing of HTRW Material; Personnel and Equipment f. Packaging	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3. 3a. Contact with chemical agent or other hazardous chemicals.	3. The Controls itemized in Controls 1 and 2 are also applicable to Control 3. 3a is changed as follows: 3a. Monitoring for VOCs and identified hazardous emissions during this operation is required. The breathing zone will be continually monitored by the Photo Ionizing Detector (PID) and appropriate Air Monitoring devices, IAW WP and SSHP. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work is being accomplished.	L

Job Steps	Hazards	Controls	RAC
4. Concrete Coring in selected environment – a. Establish Work Area Control Zones b. Mechanical Excavation c. Ordnance Identification d. Processing of RCW Material; Personnel and Equipment e. Soil Sampling for Chemical Agent (CA) or Agent Breakdown Products (APB) f. Load soils and material into drums	4. The Hazards itemized in Hazards 1, 2, and 3 are applicable to Hazard 4. 4a. Contact with chemical agent or other hazardous chemicals. 4b. Hand and Power tool operation. 4c. Pinch and cut hazard from handling sharp scrap material.	4. The Controls itemized in Controls 1, 2, and 3 are also applicable to Control 4. 4a; 4b and 4c are changed as follows: 4a. To minimize inhalation of crystalline silica dust, engineering controls will be implemented (wetting the coring surface). Protective clothing such as gloves should be worn during operation of the machinery. In addition, eye protection should be worn to protect the operator from pieces of concrete, silica and rocks that may become airborne during coring. Additionally, during concrete coring activities, an N95 dust mask will be worn by the machine operator. 4b. Since a water-cooled concrete corer will be used; a potential electrical hazard could exist. Site personnel should ensure that power cords are connected to GFCI. 4c. Same as 1j above. The cutting blade of the concrete corer presents a cutting hazard. Site personnel should take care to keep loose clothing and fingers away from the blade when operational.	L L L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Air Monitoring Equipment; Pumps; Stands 2. Hand and Power Tools 3. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 4. Heavy Equipment, as needed or specified by WP or SSHP 5. Additional equipment to conduct other operations, that may include – a. Packaging Supplies for HTW items b. 55-gal Drums for Munitions Debris collection c. 6-mil plastic bags and sheeting 6. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 7. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 8. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. 1st Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. All personnel involved in this operation that are required to wear Self-Contained Breathing Apparatus (SCBA) or a full-face Air Purifying Respirator (APR) will be certified under 29 CFR1910.134 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 6. Competent Person (UXOSO) for Soils. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. Competent Soil Person (UXOSO) will inspect the excavation daily and periodically to ensure engineering controls are adequate and working. 3. Weekly – 1st Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate air monitoring equipment, pumps, stands, and hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **MOBILIZATION/DEMOBILIZATION**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Site Set Up or Tear Down, to include install or dismantle –	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	L
a. Trailers; Tents; CONEX containers, and storage sheds (Refer to ESAT AHA for Explosive Storage Magazines)	1b.Biological hazards.	1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area.	L
		1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the	L

Job Steps	Hazards	Controls	RAC
		beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as hard ht, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and	L L

Job Steps	Hazards	Controls	RAC
		poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered/threatened species if at all possible.	L
	1d. Pinch hazard from assembly and placement of equipment.	1d. Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands to avoid sharp areas and pinch points.	L
	1e. Lifting hazards.	1e. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
	1f. Cold/Heat Stress	1f. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1g. Vehicle and heavy equipment traffic in area.	1g. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment.	L
	1h. Use of hand and power tools	1h. Use the proper tools for the specific job being performed. Be certain that the tools to be used are serviceable and free of slippery surfaces. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L

Job Steps	Hazards	Controls	RAC
	1i. Fire/Explosion	1i. Refueling of all vehicles, heavy equipment and other fueled equipment will be conducted in accordance with the SSHP, applicable SOPs and EM 385-1-1, Chapter 18. Proper fire extinguishers will be on site and serviceable. There will be no "Hot Fueling" authorized at any time.	L
	1j. Noise in excess of OSHA standards	1j. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1k. MEC/UXO Hazards	1k. Inspect the area for the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1l. Collapse Hazards	1l. Secure all locking pins and bracing supports for portable shelters and tents IAW manufacturer's manual. **Do not** use "make shift" replacement parts to secure braces or supports. Shelters and tents with missing parts will not be erected until authorized parts are on hand.	L
	1m. Inclement Weather (Winds; Snow; Ice and Dust)	1m. Personnel need to be aware of special precautions to safely erect or tear down portable shelters and tents in adverse weather conditions. Tents and collapsible shelters will be anchored to the ground to prevent being blown over in strong winds. Tents and collapsible shelters will be lowered and secured when wind speeds exceed 25mph.	L
2. Establishment/Termination of services, to include -	2. The Hazards listed in Hazard 1 are applicable to Hazard 2. Hazards 2a and 2b are added.	2. The Controls that are listed in Controls 1 are applicable to Controls 2. Controls 2a and 2b are added.	
a. Electrical connections b. Water/Sewer/Portable Toilets	2a. Underground Utilities	2a. The local utility locating hotline will be contacted to identify the locations of buried utilities before subsurface activities are allowed to commence.	L

Job Steps	Hazards	Controls	RAC
	2b. Electrical Shock.	2b. Ensure that the electrical company or equipment company installs and connects any electrical lines. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse then an electrician will be contacted to correct the problem. All electrical appliances, equipment will have a third prong for proper grounding and all electrical outlets will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 4. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 5. Two forms of Communications a. Project issued Radio b. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Certified Electrician 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. All personnel operating any motorized equipment, to include ATVs or Segways will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two form s of communications. In the event that a field crew fails to make a communications check, they will cease operations or relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **MATERIAL POTENTIALLY PRESENTING AN EXPLOSIVE HAZARD (MPPEH) INSPECTION AND MUNITION DEBRIS (MD) TURN-IN**	Overall Risk Assessment Code (RAC) (Use highest code) **H**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 29 DECEMBER 2009	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Tim Mustard; CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Establish location for desired work area to conduct operations, to include:	1a. Slip, trip and fall.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris.	L
a. Establish Work Area Control Zones in a Conventional MEC/UXO Environment	1b.Biological hazards.	1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area.	L
b. Debris Identification			
c. Munitions Debris Segregation		1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of:	L

Job Steps	Hazards	Controls	RAC
		• Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the beginning of each day; • Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long	L L

Job Steps	Hazards	Controls	RAC
		pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e. Contact with chemical agent or other hazardous chemicals	1e. Personnel will don the proper PPE commensurate with the chemical hazard encountered and the work that is being accomplished.	L
	1f. MEC/UXO Hazards	1f. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	1g. Unintentional Detonation	1g. Establish clear and defined work area zones, such as Minimum Safe Distance (MSD) between teams and non-essential personnel. All MEC/UXO work ceased when unauthorized personnel enter into the work area.	M
	1h. Severe Weather (containing potential electrical charge)	1h. UXOSO will verify through local and national weather forecast agencies that an optimum time frame to complete all MPPEH/MD operations is in effect for the area. There will be no scheduled MPPEH/MD operations during weather conditions that pose static electrical charges.	L

Job Steps	Hazards	Controls	RAC
	1i. Pinch and cut hazard from handling sharp scrap material.	1i. All UXO personnel will use good and serviceable leather gloves when handling potentially contaminated MPPEH/UXO scrap. Items have extremely sharp edges and surfaces that will cut and lacerate hands.	L
	1j. Vehicle and heavy equipment traffic in area.	1j. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	1k. Noise in excess of OSHA standards	1k. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	1l. Lifting hazards.	1l. Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	L
2. Segregate items for MPPEH assessment, to include: a. Ordnance Identification b. Disposal c. Munitions Debris Segregation	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. 2a. Contact with chemical agent or other hazardous chemicals	2. The Controls itemized in Control 1 are also applicable to Control 2. 2a. UXO Workers will don the proper PPE when handling potentially contaminated scrap metal. There is a potential of lead exposure from small arms constituents (.50 cal and smaller), or possibly explosives remnants. Lead in this form, poses only a dermal contact threat to workers. UXOSO will provide proper decontamination for workers, when dealing with small arms constituents.	L

Job Steps	Hazards	Controls	RAC
	2b. MEC/UXO Hazards	2b. MEC/UXO inspection involves a five step process. Once the item is identified as MEC/UXO, the item is destroyed through explosive means. The MEC/UXO process is repeated and if confirmed as MPPEH, the item is staged for additional disposal. Only UXO technicians will handle MPPEH/UXO material.	H
3. Segregate metal scrap and items for MD assessment, to include: a. Ordnance Identification b. Disposal, if needed c. Munitions Debris Segregation	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3. In addition, hazard 3a; 3b; and 3c are added.	3. The Controls itemized in Controls 1 and 2 are also applicable to Control 3 with 3a; 3b; and 3c added.	
	3a. Contact with chemical agent or other hazardous chemicals	3a. MPPEH/MD workers need to be aware of potential exposure to corrosive and/or flammable liquids when conducting inspections of hard targets. Any visible leaking will be immediately reported and any spills (anti-freeze, oil, hydraulic fluids, etc.) will be cleaned up immediately. UXOSO will provide proper decontamination for workers. During cutting/brazing operations, certain debris may require an established Respiratory Protection Plan; ensure local ventilation/engineering controls are in place. UXOSO will monitor exposure and area, if additional respiratory guidance is needed. See Brazing, Cutting AHA.	L
	3b. Hand and Power tool operation	3b. When operating power tools they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning. Hand and power tool use will be IAW EM 385-1-1, Chapter 13.	L
	3c. Fire/Explosion	3c. Proper fire extinguishers will be on site and serviceable.	L

Job Steps	Hazards	Controls	RAC
4. Segregate non UXO metal scrap and non metal scrap items assessment, to include: a. Munitions Debris Segregation b. Packaging	4. The Hazards itemized in Hazards 1, 2, and 3 are applicable to Hazard 4. 4a. Pinch and cut hazard from handling sharp scrap material.	4. The Controls itemized in Controls 1, 2, and 3 are also applicable to Control 4. 4a. All UXO personnel will use good and serviceable leather gloves when handling all types of range residue scrap. Items include barbed wire; damaged and cut tires and creosote treated timbers that have extremely sharp edges and surfaces which will cut and lacerate hands.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Cutting and Brazing material and equipment, to include PPE b. Hand Metal Saw/Wet Saw c. Wrenches and Vises d. MPPEH/MD Storage Bins/Drums 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications c. Project issued Radio d. Project supplied or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. All personnel operating heavy equipment will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 4. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. 5. Certified Cutting/Brazing Operator Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate hand and power tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **PORTABLE HAND HELD POWER TOOLS, SAWS, GRINDERS, AND PNEUMATIC TOOL OPERATIONS**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location: Seneca Army Depot		
Contract Number: W912DY-08-D-0003		
Date Prepared: 29 DECEMBER 2009		
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir		
Reviewed by (Name/Title): Tim Mustard, CIH		
Notes: (Field Notes, Review Comments, etc.)		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. General Operations, to include: a. Site Preparation b. Proper Tool Selection c. Equipment Load-Out	1a. Slip, trip and fall. 1b.Biological hazards.	1a. Worker awareness of potential slippery surfaces and tripping hazards plus inspection and policing of debris. 1b. Conduct a reconnaissance of the area to be used to ensure there are no biological hazards or endangered flora/fauna species present. The individual conducting the recon must take precautions and be certain that they are wearing a long sleeved shirt and have used the appropriate insect repellent if desired. Any biological hazards encountered will be noted in the log and if possible the site located to a more suitable area. 1b. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as baseball cap or head scarf. Daily protective controls will consist of: • Field personnel applying a protective barrier cream (such as Ivy X©) to potentially exposed skin at the beginning of each day;	L L L

Job Steps	Hazards	Controls	RAC
		• Use of a protective cover on automobile seats, to be replaced each day; • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu©) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin); • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day; and • Any other protective measures deemed appropriate. 1b. Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks; • Application of a Permethrin©/Permanone© spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry (Never apply directly on skin) and application of insect repellant containing DEET© on exposed skin; • Use of Duct tape to blouse pants and create a protective seal; • Field tick-checks to be performed at breaks throughout the day using the Buddy System; and • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water. 1b. Stinging/Biting Insects and Poisonous Snakes - PPE for avoidance of stinging/biting insects (I.e. Spiders, Bees) and poisonous snakes will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as a hard hat, baseball cap or head scarf. UXOSO will brief field crews on all potential stinging and biting insects and poisonous snakes that inhabit the work area. Descriptive Information	L L

Job Steps	Hazards	Controls	RAC
		Packets will be posted in the Field Office and given to Field Team Leaders. Daily protective controls will consist of: • Field personnel need to be aware of their surroundings; • Use of PPE (gloves) when moving or disturbing piles of old wood/logs and large rocks; • Nest of bees, wasps or hornets need to be identified and avoided; and • Consider all snakes to be poisonous and avoided (**Note:** Snakes tend to seek the shade generated by vehicles. Operators need to be aware and take extra precautions when approaching, reaching under and entering vehicles in areas prone with snakes.)	
	1c. Endangered/threatened flora/fauna.	1c. Conduct reconnaissance IAW approved WP and avoid endangered and threatened species if at all possible.	L
	1d. Cold/Heat Stress	1d. All site activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
	1e.Inspect Tools for Proper Guards and Electrical Cords (Failure of Integral Safety Equipment)	1e. All portable power tools will be inspected, and maintained in accordance with manufacturer's instructions and recommendations, and will only be used for the purpose for which designed. Portable power tools will be inspected, tested, and determined to be in safe operating condition before use. They will be in good repair and with all required safety devices installed and properly adjusted. Portable power tools having defects that will impair their strength or render them unsafe will be removed from service. Power tools equipped with guards will be inspected to ensure guards are in place and operational. Operators will not wear control loose clothing or long hair that may get caught in the tool and cause injury.	L
2. General Operations of Tools, to include: a. Normal Operations b. Perform Operator Level Maintenance	2. The Hazards itemized in Hazard 1 are applicable to Hazard 2. In addition hazard 2a, 2b, 2c, 2d; 2e; 2f; 2g; 2h; 2i; 2j; 2k; 2l and 2m are added.	2. The Controls itemized in Control 1 are also applicable to Control 2.	

Job Steps	Hazards	Controls	RAC
	2a. Electrical Shock.	2a. Most hand tools are battery operated and requires to be re-charged at the end of each day's operation and some require a supplied electrical source, such as a generator or "hard wired" connections. Electrical hook-ups and installation, if required, will be conducted by a certified electrician, local electrical company or equipment company. In the event there is an electrical problem that cannot be corrected by merely un-plugging and re-plugging an item or replacing a blown fuse, then an electrician will be contacted to correct the problem. All electrical appliances, extension cords and equipment will have a third prong for proper grounding; all electrical outlets used on project sites will have three pronged receptacles and meet the requirements of EM 385-1-1, Chapter 11. GFCIs will be used for all outdoor connections.	L
	2b. Airborne Dust/Particulates	2b. Project CIH will establish Respiratory Protection Plan; ensure local ventilation/engineering controls are in place. UXOSO will monitor exposure and area, if additional respiratory guidance is needed.	L
	2c. Eye/Foot and Hand Hazards	2c. Eye/Face Protection – Safety glasses with side shields (ANZI Z87.1) or face shield as applicable; Appropriate footwear as required, but safety toed footwear may be required depending on task; Sturdy leather work gloves as required.	L
	2d. Ergonomic Hazards	2d. Reduce bending, twisting, and kneeling, by using alternating work, rotating workers and periodic stretching break to reduce static or awkward postures. Use team lifting, and lifting aids to minimize lifting weights over 25-lbs above the shoulders, below the knees, or at arm length.	L
	2e. Pinch and cut hazard	2e. Operators will use good and serviceable leather gloves when using power tools.	L
	2f. Towing Hazards	2f. When transporting generator or large motor power source for tools by trailers, the trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When attempting to hook onto the trailer, "ground guides" will not place any part of between the trailer and vehicle.	L

Job Steps	Hazards	Controls	RAC
	2g. MEC/UXO Hazards	2g. If an MEC item is encountered alert the rest of the team and conduct an inspection of the item IAW the approved WP, SOP and EM 385-1-97.	M
	2h. Noise in excess of OSHA standards	2h. If the heavy equipment and/or power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	2i. Vehicle and heavy equipment traffic in area.	2i. Be aware of any vehicles or heavy equipment in area and be certain to wear a hard hat, safety glasses, and a high visibility safety vest when working around heavy equipment. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the boom, shovel, etc.	L
	2j. Power Saws (Table, Circular, Miter and Band)	2j. Table Saw – Always use blade guard, splitter and anti-kickback fingers on all "through-sawing" operations. Never perform any operation "free hand", stand or have any part of the body in line with the path of the saw blade. Never reach behind or over the blade with either hand while the saw is operating. Never attempt to free a stalled saw blade without first "turning off" the power. Always lower or remove saw blade when equipment is not in use. Never use a damaged saw blade or one that has been dropped. Circular Saw - Will be equipped with guards that automatically and completely enclose the cutting edge, splitters, and anti-kickback devices. All portable power-driven circular saws will be equipped with guards above and below the base plate. The upper and lower guards will cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts and for minimum arc required to allow retraction and contact the work. When the tool is withdrawn from the work, the lower guard will automatically and instantly return to the covering position. Miter Saw – Guard miter saws with an upper hood that completely encloses the upper half of the blade. Guard the lower blade by making sure the teeth are guarded at least ¾ of	L

Job Steps	Hazards	Controls	RAC
		an inch beyond the root of the teeth, towards the center of the blade with a retractable guard that **cannot be locked in any position**. Band Saw – Enclose or guard all portions of the blade except for the working portion of the blade between the guide rolls and the table. Ensure the guard for the portion of the blade between the sliding guide and the wheel guard – protects the front and outer side of the blade and is self-adjusting to move with the guide. Ensure the gap between the guide rolls and the work is as small as is practical. Ensure band saws have a tension control device to indicate the proper tension for standard saws used on the machine. Protect employees passing near-by providing a 4-foot clearance when the saws are in use.	
	2k. Pneumatic Tools (Wrenches, Fasteners and Driving Tools)	2k. Follow the manufacturer's instructions and prevent air tools from ejecting attachments. Protect employees from contact with compressed air. Ensure tool nozzles or an air hose opening is not pointed at anyone or allowed to contact a person's body. Air nozzle pressure is not to exceed 30psi, when cleaning with compressed air. Place barriers, baffles or screens to protect other workers. Appropriate PPE needs to be worn when cleaning with compressed air. Air Hose and Plastic Pipe – Ensure air hose and hose connections are suitable for the air pressure that is supplied. Ensure any plastic pipe used to supply compressed air to portable air tools has been specifically identified by the manufacturer as being suitable for compressed air use. Tool Design and Construction – Ensure air tools are adequately designed and constructed for the task. Tool Use – Use air tool safely. (1) relieve pressure in the air line before disconnecting a compressed air tool from the line or disconnecting a hose joint, unless there is an automatic valve closing protection at the joint being separated, (2) disconnect the tool from the compressed air supply before repairs are done, and (3) ensure that adequate eye protection is worn at all times by the personnel using the tool and other workers in the area. Fastener/Driving Tools – Ensure fastener/driving tools (nailers and staplers) are safe. (1) ensure any fastener/driving tool discharges all air in the tool when disconnected from the compressed air supply, (2) ensure that pneumatically driven	L

Job Steps	Hazards	Controls	RAC
		nailers, staplers and similar equipment provide with automatic fastener feed have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface and (3) all portable, hand held air tools meet the requirements of ANSI B186.1-1984, Safety Code for Portable Air Tools or ANSI/SANTA SNT-101-1993, Portable, Compressed-Air-Actuated, Fastener Driving Tools-Safety Requirement.	
	2l. Pressurized cylinders – sudden release of contents.	2l. Periodic inspection of all pressurized cylinders by operator. Proper storage of cylinders in accordance with SOPs and EM 385-1-1, chapter 20.	L
3. General Tool Repair and Service	3. The Hazards itemized in Hazards 1 and 2 are applicable to Hazard 3. In addition, hazard 3a; 3b and 3c are added.	3. The Controls itemized in Controls 1 and 2 are applicable to Control 3.	
	3a. Hand Portable Electric Tools	3a. All repairs to hand portable electric tools will be done by a qualified electrician or service technician. Hand portable electric tools will serviced, IAW manufacturer's specifications	L
	3b. Permanently installed Tools	3b. Repairs and servicing of permanently installed tools (band saws, table saws, etc) will be done by a qualified electrician. "Lock Out/Tag Out" procedures on the electrical circuit or the equipment being repaired or serviced will be adhered to during these operations.	L
	3c. Pneumatic Tools	3c. All repairs to pneumatic (air compressed) power tools will be done by a qualified service technician. Servicing of these tools will be done, IAW manufacturer's specifications.	L
4. General Tool Storage	4. The Hazards itemized in Hazards 1, 2, and 3 are applicable to Hazard 4. In addition, hazard 4a and 4b are added.	4. The Controls itemized in Controls 1, 2, and 3 are applicable to Control 4.	
	4a. Hand Portable Electric Tools	4a. When not in use, all hand portable electric tools will be stored in their manufacturer's supplied carrying/storage case, in a storage bin or trailer, in such a manner as not to do damage to the tool or its electrical cord, switch or plug.	L

Job Steps	Hazards	Controls	RAC
	4b. Pneumatic Tools	4b. When not in use, all portable pneumatic tools will be stored in their manufacturer's supplied carrying/storage case, storage bin or trailer, in such a manner as not to do damage to the tool or its compressed air nozzle. Air hoses will be coiled without kinks or sharp bends and either hung up or placed flat in a storage bin.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and Power Tools 2. Appropriate PPE for selection operation, at minimum – a. Long Sleeve Shirt b. Long Legged Pants c. Sturdy Work Boots d. Leather Gloves e. Safety Glasses, when required f. Hard Hat, when required g. Safety Vest, when required h. Steel-toed boots, as directed i. Additional PPE to conduct other operations, as directed 3. Heavy Equipment, as needed or specified by WP or SSHP 4. Additional equipment to conduct other operations, that may include – a. Compressed Gas Cylinders; b. Nail Guns; 5. Designated Site vehicles will be equipped with the minimum - a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing c. Serviceable First Aid Kit d. Serviceable A:BC rated 2.5lb or larger fire extinguisher 6. Other vehicles designated as personnel conveyance will be equipped with – a. Map and Directions to site medical facility b. Project Emergency Contact Telephone Listing 7. Two forms of Communications a. Project issued Radio b. Project or personal Cellular Phone	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Personnel operating any powered tool will provide proof of competency (documentation of training or experience) to the UXOSO prior to operating the equipment. 5. UXO Personnel must be certified as an EOD-trained and must have the necessary experience for the position filled. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Initial (Site Selection) – General inspection of assembly area. Equipment will be inspected daily by operator prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement. 2. Daily- Housekeeping of assembly and work areas for debris and hazards. UXOSO will perform audits and spot checks to verify compliance. UXOSO will update site's MSDS files on all items, supplies and material brought onto site. Periodic communication checks between Field Office or UXOSO and Field Crews, as deemed necessary, to ensure crew's status and relay emergency information. Field Office and UXOSO will maintain a telephonic roster of all site personnel's cellular phone numbers to ensure two forms of communications. In the event that a field crew fails to make a communications check, they will cease operations and relocate to re-establish communications link with the Field Office or UXOSO. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment. 4. Final (Site Departure) – Inspection of the entire area to ensure the site is left in the same or better than when we arrived.

Training Requirements: Only qualified personnel will be allowed to operate portable hand held power tools, saws, grinders, and pneumatic tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **WALKING/WORKING IN RUGGED TERRAIN**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 2010 MAY 17	
Prepared by (Name/Title): Niall D. Henshaw	
Reviewed by (Name/Title): Tim Mustard, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
Walking/hiking taking place in rugged terrain ranging from relatively flat land to steep, rugged topography and from wetland to desert conditions. Also includes hiking in streambeds	1. Slips, trips and falls	<u>Situational awareness</u> is a control which will be critical in all aspects of this AHA. Situational awareness consists of LOCATION, LOCATION, AND LOCATION. Can you answer the following four questions: 1) Where am I and where is my buddy? 2) What things can hurt me? 3) How do I get out? 4) Where is the essential equipment (GPS, keys, phone, emergency contact numbers etc.)? 1a. Prior to activity, ensure that the footwear has adequate non-slip soles and ankle-support. 1b. Perform warm-up exercises before undertaking the activity. This will keep the muscles loose and ready for unforeseen movement.	M

Job Steps	Hazards	Controls	RAC
		1c. Show up fit, alert, and ready to work. Part of this site activity involves strenuous hiking in difficult terrain. 1d. Ensure that you are thoroughly inspecting the ground in front of you for possible wet or muddy spots, holes, vines, rocks etc. that could cause you to slip, trip or fall. Carefully pick the spots where you intend to step. 1e. Walk carefully in uneven terrain, especially when the ground surface may be obscured by vegetation or during twilight or evening.	
	2. Falling down and landing on ground.	2a. If you do slip and commence to fall, attempt to fall on your side uphill and not on your outstretched arms. This will prevent injury to your hands, wrists, and arms. 2b. When walking across a side-hill, be careful not to walk directly above or below another person. Watch for loose and falling rocks. 2c. Be especially careful of foot placement while side hilling. Avoid twisting an ankle/knee.	M
	3. Side-hilling	3a. Always treat hilly and mountainous topography with caution. Be particularly alert for falling rocks, rock slides, or rock falls when working/walking in proximity to cliff faces or steep rock outcrops. If working in an area (i.e. a cliff) where rocks could potentially fall on your head, be very aware of your surroundings.	L
	4. Falling Rocks	4a. Carefully pick the spots where you intend to step. Be careful of dislodging rocks onto other workers below or following you. If rocks are falling/rolling down the hill, yell "ROCK" or similar warning to workers below you.	L
	5. Walking/hiking in uneven areas	5a. When hiking in wet areas or in proximity to water, beware of stepping onto slippery rocks, slopes, or ground. Be cautious of stepping onto unsupported	L

Job Steps	Hazards	Controls	RAC
		vegetation, soft mud, or quicksand. Use a pole or branch to probe the path surface ahead of you when crossing wetland areas. Wet rocks can be slick. Take extra care when crossing these areas. Use a pole or branch to probe the path surface ahead of you, if visibility is impaired.	
		5b. In descent you should find it easier if you keep your knees slightly bent and your body weight back so that you are in a partial sitting position. Your centre of gravity will be lower and this will help you maintain good balance especially when combined with the use of long poles.	L
	6. Remote locations	6a. Each field team will have some means of communication with either the other teams or the base station (radio/cell phone) to use for emergency communication. Although it is not anticipated that team members will be outside of voice range from one another, they will maintain radio contact at all times.	L
	7. Poking face/eye with branches	7a. Wear eye protection to prevent the branches from poking you in the face.	L
		7b. When moving through the brush/juniper trees, watch for branches.	
		7c. Keep your "situational awareness" to assess if the trees/brush has the potential to come in contact with you. Use your hands and body to move the branches aside. If your partner is close to you and may be hit by the branches, warn them of the hazard.	
	8. Biological Hazard (poisonous plants, ticks, bees, mosquitoes, snakes, spiders, etc.)	8a. Hazardous Plants PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as baseball cap or head scarf.	L
		8b. Closely look for snakes or insects before placing your hands on objects such as rock outcrops or trees or picking up objects from the ground.	

Job Steps	Hazards	Controls	RAC
		8c. If you encounter a snake, remain calm and back away slowly. Always give snakes plenty of room to escape from you. Never approach, tease, corner, or poke at any snake. 8d. PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as baseball cap or head scarf. Team members will perform self-inspection for ticks when showering after work. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water.	
	9. Severe weather conditions	9a. Dress appropriately for the weather conditions: as necessary wear a hat, long pants, boots or sturdy shoes, jacket, and skin and eye protection (i.e., sunscreen and sunglasses). 9b. Layered clothing made of wool or synthetic (polyester, polar fleece, etc.) is most efficient in protecting you from the weather and can be removed or added as needed. 9c. Other items that should at least be present in the vehicle include raingear, warm shirt or jacket, emergency food (granola bars or other non-perishable items), waterproof matches or cigarette lighter, pocket knife, flashlight, duct tape, emergency thermal blanket, and maps. These items should be carried with the field team if they are planning on hiking a long distance from the vehicle. 9d. Whenever a lightning threat becomes apparent, move to a low spot and seek shelter immediately.	L

Job Steps	Hazards	Controls	RAC
		9e. The team will carry First Aid Kit - for any small emergencies. It should also contain sunscreen and insect repellent.	
	10. Heat and Cold Stress	10a. As the summer approaches and the temperature rises heat stress will become critical. With dehydration, comes a decrease in the ability to think and concentrate. Staying hydrated will allow you to remain alert and less likely to lose concentration and slip/fall. 10b. Drink plenty of fluids to maintain adequate levels of hydration. 10c. During warm weather, ensure at least that the team will carry at least 1 gallon of drinking water per person.	M
	11. Strains and sprains	11a. Treatment of Sprains and Strains: First aid measures for a sprain or strain can best be remembered by the acronym RICE - Rest, Ice, Compression, and Elevation. ***Rest*** the injured area. Try not to move or put pressure on the affected joint. A sling or splint may be recommended to immobilize the joint and allow damaged ligaments or muscles to heal. ***Ice*** the affected area to reduce swelling. After 24 hours, either ice or heat may be applied to reduce pain. ***Compress*** the joint by wrapping it in an Ace bandage to help reduce swelling and pain. ***Elevate*** the joint to reduce swelling.	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand held magnetometer, DGM mapping 2. Hand tools, shovel 3. Appropriate PPE for selection operation, as necessary a. gloves b. work boots c. eye protection d. hard hats e. hearing protection 4. Depending on condition requirements also make sure everyone has: a. an adequate supply of water and emergency food or snacks. b. at least one small first aid kit/team c. sunscreen d. insect repellant e. maps, compass f. GPS g. survival gear (matches/lighter, knife, emergency blanket, raingear, etc.)	Qualified Personnel 1. First Aid/CPR – at least one individual. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Enrolled in medical monitoring program 4. UXO awareness as a component of their site-specific training 5. Parsons Safety Training (ParsonsU)	Workers will inspect PPE before each use in accordance with the manufacturer's instructions. If equipment fails to function properly during inspection or during use, equipment is to be turned in for repair/ replacement. Inspect contents of first aid kit.

Training Requirements: Only qualified personnel will be allowed to operate hand held magnetometer, DGM mapping shovel, and hand tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **SURFACE SWEEP/CLEARANCE**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 2011 JUNE 10	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title): Ed Grunwald, CIH	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible.

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
Walking/hiking over terrain that may be contaminated with UXO or other hazards to individuals or the environment.		Situational awareness is a control which will be critical in all aspects of this AHA. Situational awareness consists of LOCATION, LOCATION, AND LOCATION. Can you answer the following four questions: 1) Where am I and where is my buddy? 2) What things can hurt me? 3) How do I get out? 4) Where is the essential equipment (GPS, keys, phone, emergency contact numbers etc.)?	
	1. Slips, trips and falls	1a. Prior to activity, ensure that the footwear has adequate non-slip soles and ankle-support.	L

Job Steps	Hazards	Controls	RAC
		1b. Ensure that you are thoroughly inspecting the ground in front of you for possible wet or muddy spots, holes, vines, rocks etc. that could cause you to slip, trip or fall. Carefully pick the spots where you intend to step.	L
		1c. Walk carefully in uneven terrain, especially when the ground surface may be obscured by vegetation.	L
	2. Poking face/eye with branches	2a. Wear eye protection to prevent the branches from poking you in the face.	L
		2b.When moving through the brush/trees, watch for branches.	L
		2c. Keep your "situational awareness" to assess if the trees/brush has the potential to come in contact with you. Use your hands and body to move the branches aside. If your partner is close to you and may be hit by the branches, warn them of the hazard.	L
	3. Biological Hazard (poisonous plants, ticks, bees, mosquitoes, snakes, spiders, etc.)	3a. Hazardous Plants PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as baseball cap or head scarf.	L
		3b. Closely look for barbs, sharp objects, snakes or insects before placing your hands on objects such as rock outcrops or trees or picking up objects from the ground.	L
		3c. If you encounter a snake, remain calm and back away slowly. Always give snakes plenty of room to escape from you. Never approach, tease, corner, or poke at any snake.	L
		3d. PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as baseball cap or head scarf. Team members will perform self-inspection for ticks when showering after work.	L

Job Steps	Hazards	Controls	RAC
		3e. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water.	L
		3f. Ensure that you inspect each piece of PPE i.e., gloves, hat and your boots for "critters" prior to donning them and upon doffing them. Be sure to keep your PPE in a safe, dry place to limit the critters from making a home in them. Shake out your boots prior to putting them on and if you can turn your gloves inside out prior to putting them on, but at a minimum shake them out.	L
	4. Severe weather conditions	4a. Dress appropriately for the weather conditions: as necessary wear a hat, long pants, boots or sturdy shoes, jacket, and skin and eye protection (i.e., sunscreen and sunglasses).	L
		4b. Layered clothing made of wool or synthetic (polyester, polar fleece, etc.) is most efficient in protecting you from the weather and can be removed or added as needed.	L
		4c. Other items that should at least be present in the vehicle include raingear, warm shirt or jacket, emergency food (granola bars or other non-perishable items), waterproof matches or cigarette lighter, pocket knife, flashlight, duct tape, emergency thermal blanket, and maps. These items should be carried with the field team if they are planning on hiking a long distance from the vehicle.	L
		4d. Whenever a lightning threat becomes apparent, move to a low spot and seek shelter immediately.	L
		4e. The team will carry First Aid Kit for any small emergencies. It should also contain sunscreen and insect repellent.	L

Job Steps	Hazards	Controls	RAC
	5. Heat and Cold Stress	5a. As the temperature rises heat stress will become critical. With dehydration, comes a decrease in the ability to think and concentrate. Staying hydrated will allow you to remain alert and less likely to lose concentration and slip/fall.	L
		5b. Drink plenty of fluids to maintain adequate levels of hydration.	L
		5c. During warm weather, ensure at least that the team will carry at least 1 gallon of drinking water per person.	L
	6. Strains and sprains	6a. Treatment of Sprains and Strains: First aid measures for a sprain or strain can best be remembered by the acronym RICE - Rest, Ice, Compression, and Elevation. **R**est the injured area. Try not to move or put pressure on the affected joint. A sling or splint may be recommended to immobilize the joint and allow damaged ligaments or muscles to heal. **I**ce the affected area to reduce swelling. After 24 hours, either ice or heat may be applied to reduce pain. **C**ompress the joint by wrapping it in an Ace bandage to help reduce swelling and pain. **E**levate the joint to reduce swelling.	L
	7. Operating magnetometers	7a. Ensure that you have at least one hand free while walking when conducting a sweep or a surface clearance to provide balance and a means of breaking your fall should you slip or trip.	L
		7b. Maintain your proper distance from the individual on your right or left and warn the team should you encounter a hazard of see one in their rout of travel.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand held magnetometer, DGM mapping 2. Hand tools, shovel 3. Appropriate PPE for selection operation, as necessary a. gloves b. work boots c. eye protection d. hard hats e. hearing protection 4. Depending on condition requirements also make sure everyone has: a. an adequate supply of water and emergency food or snacks. b. at least one small first aid kit/team c. sunscreen d. insect repellant e. maps, compass f. GPS g. survival gear (matches/lighter, knife, emergency blanket, raingear, etc.)	Qualified Personnel 1. First Aid/CPR – at least one individual. Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Enrolled in medical monitoring program 4. UXO awareness as a component of their site-specific training 5. Parsons Safety Training (ParsonsU)	1. Daily - Workers will inspect PPE before each use in accordance with the manufacturer's instructions. If equipment fails to function properly during inspection or during use, equipment is to be turned in for repair/ replacement. 2. Weekly - First aid kit(s).

Training Requirements: Only qualified personnel will be allowed to operate hand held magnetometer, DGM mapping, shovel, and hand tools.

Training Acknowledgement:

Printed Name	Signature	Date

Activity Hazard Analysis (AHA)

Activity/Work Task: **VEGETATION REMOVAL**	Overall Risk Assessment Code (RAC) (Use highest code) **M**
Project Location: Seneca Army Depot	
Contract Number: W912DY-08-D-0003	
Date Prepared: 2009 SEPTEMBER 9	
Prepared by (Name/Title): Michael E. Short/Technical &Ops. Dir	
Reviewed by (Name/Title):	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Pre-Vegetation Removal UXO Survey	1a. Slips, trips and falls	1a. Ensure that you are thoroughly inspecting the ground in front of you for possible wet or muddy spots, holes, vines rocks etc. that could cause you to slip, trip or fall.	L
	1b. Presence of UXO	1b. Inspect the area to be cleared of vegetation for the presence of UXO using a magnetometer to assist in finding items in brush and dense vegetation. If UXO is encountered and it is not acceptable to move, it will be marked with crossed pin flags and dealt with IAW the approved WP. If the item is acceptable to move, it will be relocated to an area outside of the area to be cleared and reported IAW the approved WP.	M
	1c. Biological hazards	1c. Hazardous Plants - PPE for avoidance of hazardous plants (specifically Poison Ivy/Oak and Sumac) will consist of long sleeved shirts and long pants, or coveralls; safety glasses; leather gloves; and head cover such as baseball cap or head scarf. Daily protective controls will consist of:	L

Job Steps	Hazards	Controls	RAC
		• Field personnel applying a protective barrier cream (such as IvyX) to potentially exposed skin at the beginning of each day, • Use of a protective cover on automobile seats, to be replaced each day, • Field personnel washing with poison ivy/oak oil cleanser (such as Tecnu) (following directions on bottle) at breaks and the end of each field day, or as soon as a rash appears (do not apply to broken skin), • Field personnel changing into clean clothing or removing coveralls and removing automotive seat covers before leaving the site each day, • Any other protective measures deemed appropriate. 1.c Ticks - PPE for avoidance of tick bites will consist of long sleeved shirts and long pants, or coveralls; leather gloves; and head cover such as baseball cap or head scarf. Daily protective controls will consist of: • Wearing light colored clothing to easily identify presence of ticks. • Application of a Permethrin/Permanone spray to clothing the day before field work. (Note: this is to be sprayed on **clothing only** and allowed to dry. Never apply directly on skin) and application of insect repellant containing DEET on exposed skin. • Use of Duct tape to blouse pants and create a protective seal. • Field tick-checks to be performed at breaks throughout the day using the Buddy System. • Daily inspection of entire body to locate attached ticks after removal of clothing. If a tick is imbedded in the skin, tick removal will be performed with narrow headed tweezers available in each field kit. The tick will be grabbed where the mouthparts enter the skin and the tick gently pulled out and then crushed. The bite area and the hands will be cleansed with an antiseptic wipe found in the field kit or soap and water.	L

Job Steps	Hazards	Controls	RAC
	1d. Heat and Cold Stress	1d. All site preparation activities must be conducted IAW the approved WP ensuring that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries. Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	L
2. Manual Vegetation Removal	2a. Slip, trip and falls	2a. Ensure that you are thoroughly inspecting the ground in front of you for possible wet or muddy spots, holes, vines rocks etc. that could cause you to slip, trip or fall. Ensure that you have solid footing and are not in an awkward position when operating/using hand and power tools.	L
	2b. Power tool operation	2b. When operating power tools such as weed eaters, chainsaws etc. they will be handled, operated and maintained IAW the manufactures instructions, the approved WP and any applicable SOPs. The power tool will be inspected prior to use to ensure that all of the hand and safety guards are in place and that the chain, if present, is properly tightened and that the tool is otherwise in good working order. Depending on the power tool PPE will vary and it too must be serviceable, operable and free of any defect. PPE will be worn IAW the approved WP and inspected by the user prior to donning.	L
	2c. Noise in excess of OSHA standards	2c. If the power tools used are louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn.	L
	2d. Biological hazards	2d. The same as 1c. above.	L
	2e. The presence of UXO	2e. The same as 1b above.	L
	2f. Heat and Cold Stress	2f. The same as 1d.	L

Job Steps	Hazards	Controls	RAC
3. Mechanical Vegetation Removal	3a. Heavy equipment in the area	3a. Be aware of any heavy equipment in area and be certain to wear hard hat, safety glasses and orange safety vest when working around heavy equipment. Heavy equipment operator must be currently certified for the piece of equipment he is operating. Establish arm and hand signals or radio communication with the equipment operator and be certain the equipment is grounded and shut off when within the arc of the shredder, if applicable. When the heavy equipment is in use a safety UXO technician observer must be present to ensure that the operation is run IAW the approved WP, SOP and AHA. Any heavy equipment used must have a back-up alarm, be in good working order and free of oil or hydraulic fluid leaks. Depending on the type of vegetation removal equipment being used it may be necessary to establish a safety area to ensure no one is hit with flying debris from the blades.	L
	3b. Noise in excess of OSHA standards	3b. More than likely the vegetation equipment used will be louder than 85dB (A) then the appropriate hearing attenuation PPE must be worn. This could be ear plugs, ear muffs or both depending on the noise level. The site safety officer will measure the noise level of the equipment and prescribe the applicable noise attenuation PPE to be worn by the operator and the personnel within close proximity to the equipment.	L
	3c. Presence of UXO	3c. The operator must be observant to the possible presence of UXO and if encountered stop the equipment and proceed IAW the approved WP.	L
	3d. Heat and Cold Stress	3d. The same as 1d.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
1. Hand and power vegetation removal equipment. 2. Mechanical vegetation removal equipment 3. Site vehicles 4. Magnetometers 5. Radios	Qualified Personnel 1. First Aid/CPR – UXOSO or site safety officer and one other individual. 2. Site Manager or SUXOS 3. Heavy equipment operator, if Applicable Training 1. Site-specific WP, SOP and AHA 2. OSHA 40 hour and applicable 8 hour 3. Equipment operation 4. Heat/Cold Stress 5. Biological hazards 6. Flora/Fauna endangered/threatened 7. Daily safety and operational briefing 8. Site visitor training	1. Daily- Housekeeping of assembly and work areas for debris and hazards. 2. Daily - Pre-operation checks of equipment. 3. Weekly – First Aid/CPR kit(s), fire extinguisher(s), vehicles and equipment.

Training Requirements: Only qualified personnel will be allowed to operate hand and power vegetation removal equipment.

Training Acknowledgement:

Printed Name	Signature	Date

ATTACHMENT 3

STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURE
NUMBER 1

DEMOLITION OPERATIONS

SOP 1 - DEMOLITION OPERATIONS

1.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of demolition/disposal operations on sites contaminated with Munitions and Explosives of Concern (MEC).

1.2 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of demolition/disposal operations on an MEC contaminated site. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in section 1.3 of this SOP for additional compliance issues.

1.3 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of demolition/disposal operations:

- Parsons Corporate Safety and Health Program;
- EM 385-1-97, Explosives Safety and Health Requirements Manual;
- EP 1110-1-17, Establishing a Temporary OB/OD Site for Conventional Ordnance and Explosives Projects;
- USACE EM 385-1-1, Safety and Health Requirements Manual;
- DoD 4145.26-M, Contractor's Safety Manual for Ammunition and Explosives;
- DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards;
- DA PAM 385-64, Ammunition and Explosives Safety Standards;
- TM 60A-1-1-31, EOD Disposal Procedures;
- AR 190-11, Physical Security of Arms, Ammunition and Explosives;
- ATF 5400.7, Alcohol Tobacco and Firearms Explosives Laws and Regulations; and
- Applicable sections of DOT, 49 CFR Parts 100 to 199.

1.4 RESPONSIBILITIES

1.4.1 Project Manager

The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

1.4.2 Senior UXO Supervisor

The Senior UXO Supervisor (SUXOS) will be responsible for assuring that adequate safety measures and housekeeping are taken during demolition activities, and shall visit demolition locations to ensure that demolition operations are carried out in a safe, clean, efficient and economical manner.

1.4.3 UXO Technician III (Demolition Supervisor)

A designated UXO Tech III shall act as the Demolition Supervisor (DS). There may be more than one DS assigned to a project site due to conducting simultaneous operations and divergent sites. The demolition activities shall be conducted under the direct control of the DS, who will have the responsibility of supervising all demolition operations assigned to him. The DS shall be responsible for training all on-site UXO demolition personnel on his team regarding the nature of the materials handled, the hazards involved and the precautions necessary to conduct a safe demolition operation. The DS will also ensure that the Daily Operational Log, Demolition Shot Records and inventory records are properly filled and accurately depict the demolition events and demolition material consumption for each day's operations. The DS shall be present during all demolition operations.

1.4.4 UXO Safety Officer

The UXO Safety Officer (UXOSO) for the site is responsible for ensuring that all demolition operations are being conducted in a safe and compliant manner, and is required to be present during all demolition operations. The only exception to this rule is when the project site has multiple sites conducting concurrent munitions response (MR) operations, and it is impossible for the UXOSO to be present at each shot. In that event a demolition team safety officer will be designated. This individual will report to the UXOSO and assume the UXOSO's responsibilities at the designated demolition operation. In this situation, the UXOSO will conduct periodic safety audits of the demolition teams and assist the demolition team's safety officers in the performance of their duties. The UXOSO or demolition team safety officer will inspect the demolition shot(s) for hazards and then assisted by the DS and UXO Tech IIs, will inspect each demolition pit and an area of up to 250 feet in radius after each demolition shot to ensure that no kick-outs of hazardous MEC components or other hazardous items has occurred.

1.4.5 UXO Quality Control Specialist

The UXO Quality Control Specialist (UXOQCS) is responsible for inspecting, the Daily Operational Log, the Demolition Shot Record and the inventory of MEC and demolition material. The UXOQCS will check the pit/demolition site with a magnetometer and large metal fragments exceeding the pass/fail requirements of the SOW will be removed.

1.5 GENERAL OPERATIONAL AND SAFETY PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in operations on MEC contaminated sites shall be familiar with the potential safety and health hazards associated with the conduct of demolition/disposal operations, and with the work practices and control techniques used to reduce or eliminate these hazards.

During demolition operations, general safety provisions listed below will be strictly followed by all demolition personnel. Non-compliance with the general safety provisions will result in disciplinary action, to include termination of employment if warranted.

- All safety regulations applicable to BIP and/or demolition range activities and the destruction of MEC materials involved shall be complied with.
- Demolition of any kind is prohibited without the express authorization from the client.
- The quantity of MEC to be destroyed will be determined by the agreed to limit, with the Net explosive weight (NEW) of the demolition explosives factored into the total NEW.
- In the event of an electrical storm, or heavy snow or dust storms, immediate action will be taken to cease all demolition operations and evacuate the area.
- In the event of a fire or unplanned explosion, if possible, put out the fire. If unable to do so, notify fire and police departments and evacuate the area. If injuries are involved, remove victims from danger, administer first aid and seek medical attention.
- The DS is responsible for reporting all injuries and accidents that occur to the UXOSO.
- Demolition team personnel will not tamper with any safety devices or protective equipment.
- Any defect in demolition material or an unusual condition that is not covered by this SOP will be reported immediately to the DS and UXOSO.
- Demolition procedures shall be conducted in accordance with this SOP and applicable references in Section 1.3.
- Adequate fire protection and first aid equipment shall be provided at all times.
- All personnel engaged in the destruction of MEC shall wear under and outer garments made of close-weave natural fiber, such as cotton. Synthetic material such as nylon is not authorized unless treated with anti-static material.
- Care will be taken to minimize exposure to the smallest number of personnel, for the shortest time, to the least amount of hazard, consistent with safe and efficient operations.
- Work locations will be maintained in a neat and orderly condition.
- All demolition hand tools shall be maintained in a good state of repair.
- Each heavy equipment and/or vehicle operator will have in his possession a valid operator's permit, i.e., state driver's license, certificate of training for backhoe/excavator etc.
- Leather or leather-palmed gloves will be worn when handling wooden boxes, munitions or MEC. If bulk or binary explosives are being handled then rubber gloves, such as Nitrile, will be worn
- Lifting and carrying require care. Improper methods cause unnecessary strains. Observe the following preliminaries before attempting to lift or carry:

- When lifting, keep your arms and back as straight as possible, bend your knees and lift with your leg muscles; and
- Be sure you have good footing and hold, and lift with a smooth, even motion.
- The demolition BIP location and/or range shall be provided with telephone and radio communication.
- Motor vehicles and material handling equipment (MHE) used for transporting MEC or demolition materials must meet the following requirements:
- Exhaust systems shall be kept in good mechanical repair.
- Lighting systems shall be an integral part of the vehicle.
- One 20 BC rated portable fire extinguisher shall be, if possible, mounted on the vehicle outside of the driver's cab or two 10BC fire extinguishers, with one inside the cab and the other near the front portion of the vehicle bed, nearest the driver.
- Wheels of carriers must be chocked and brakes set during loading and unloading.
- No demolition material or MEC shall be loaded into or unloaded from, motor vehicles while the engine is operating.
- Motor vehicles and MHE used to transport demolition material and MEC shall be inspected prior to use to determine that:
- Fire extinguishers are filled and in good working order.
- Electrical wiring is in good condition and properly attached.
- Fuel tank and piping are secure and not leaking.
- Brakes, steering and safety equipment are in good condition.
- The exhaust system is not exposed to accumulations of grease, oil, gasoline, or other fuels, and has ample clearance from fuel lines and other combustible materials.
- A red warning flag, such as a "Bravo Flag", a windsock, or rag will be displayed at the entrance to the demolition range and, if applicable, the entrance gate shall be locked when demolition work is in process. This is only applicable if an open detonation (OD) range has been established with demo pits for all shots.
- Unless otherwise directed, all demolition shots will be tamped with a minimum of two feet of clean earth/dirt or the appropriate thickness of sand bags as indicated on the Fragmentation Data Review Form.
- An observer will be stationed at a location where there is a good view of the air and surface approaches to the demolition range before material is detonated. It shall be the responsibility of the observer to order the DS to suspend firing if any aircraft, vehicles or personnel are sighted approaching the general demolition area.
- Two-way radios shall not be operated while the shot is primed or during the priming process. The charts shown in Attachment 1 of this SOP shall be used for determining the safe distances from transmitter antennas.

- No Demolition operation will be left unattended during the active portion of the operation (i.e., during the burn or once any explosives or MEC are brought to the BIP location or range).
- A minimum area of 200 feet in diameter shall be cleared of dry grass, leaves and other extraneous combustible materials around the demolition shot/pit area if a demolition range has been established. The area around the BIP location shall be free of any combustible material and wetted down if necessary.
- No demolition activities will be conducted if there is less than a 2,000-foot ceiling or if wind velocity is in excess of 20 mph.
- Demolition-shots must be fired during daylight hours (i.e., between 30 minutes after sunrise and 30 minutes before sunset).
- No more than two individuals shall ride in a truck transporting demolition material or MEC, and no one shall be allowed to ride in the trailer/bed.
- Vehicles shall not be refueled when carrying demolition material or MEC, and must be 100 feet from magazines or trailers containing such items before refueling.
- All vehicles used for the transport of explosives will be cleaned of visible explosive and other contamination before releasing the vehicles for other tasks.
- Prior to conducting any other task, personnel shall wash their face and hands after handling demolition material or MEC.
- At the demolition site, prior to "check-out" procedures, all blasting caps will be stored in approved containers (IME 22 or equivalent) and separated a minimum of 50 feet "downwind" from all other explosives until they are needed.
- Demolition shots/pits shall be spaced at least 25 feet apart, with no more than 10 shots/pits prepared for a series of shots at any one time. Those items unacceptable to move are the only exceptions to this rule.

1.6 SPECIAL REQUIREMENTS FOR DEMOLITION ACTIVITIES

The following safety and operational requirements shall be followed during demolition operations. Any deviations from this procedure shall be allowed only after receipt of written approval from the USAESCH PM and Parsons OE Operations Manager. Failure to adhere to the requirements and procedures listed in the paragraphs below could result in serious injury or death; therefore complete compliance with these requirements and procedures will be strictly enforced.

1.6.1 General Requirements

The general demolition range/shot requirements listed below shall be followed at all times:

- Attachment 1 of this SOP, "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites," will be followed when destroying multiple munitions by detonation.
- Attachment 2 of this SOP, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions

- Attachment 3 of this SOP, "Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" may be used when fragmentation throws and fire is a concern.
- Items awaiting explosive destruction and demolition material shall be protected against accidental ignition or explosion from fragments, grass fires, burning embers or detonating impulses originating in materials being destroyed.
- MEC or bulk explosives, acceptable to move, and destroyed by detonation can be detonated in a pit not less than three feet deep and covered with earth which protrudes not less than two feet above existing ground level. The components should be placed on their sides or in a position to expose the largest area to the influence of the demolition material. The demolition material should be placed in intimate contact with the item to be detonated and held in place by tape or earth packed over the demolition materials. The total NEW to be destroyed below ground at one time shall not exceed the agreed to limit.
- Prevailing weather condition information will be obtained from the U.S. Weather Service and the data logged in the Demolition Shot Log before each shot or round of shots.
- All shots shall be dual primed.
- A minimum of 10 seconds will be maintained between each detonation.
- Detonations will be counted to ensure detonation of all shots. After each series of detonations, a search shall be made of the surrounding area for hazardous items. Items such as lumps of explosives or unfuzed ammunition may be picked up and prepared for the next shot. Fuzed ammunition or items that may have internally damaged components will be detonated in place, if possible.
- After each-detonation and at the end of each day's operations, surface exposed munitions debris, shall be recovered from the demolition site and disposed of in accordance with contracted procedures, as well as all applicable environmental regulations. All collected munitions debris metal will be 100% inspected for absence of explosive materials by demolition range personnel and certified by the SUXOS and the UXOQCS.
- When operated in accordance with the conditions of this procedure the demolition shot should not present a noise problem to the surrounding community. However, if a noise complaint is received, the name, address and phone number of the complainant should be recorded and reported to the site manager, who in turn will report it to the Parsons PM and USAESCH PM.
- Whenever possible, during excavation of demolition pits contour the ground so that runoff water is channeled away from the pits. If demolition operations are discontinued for more than two weeks, the pits should be back filled until operations resume.
- Upon completion of the project, all disturbed demolition areas will be thoroughly inspected for MEC. According to the SOW, the site may have to be leveled and seeded to establish a permanent vegetative cover to inhibit erosion. If necessary, this will be coordinated with the contractor representative. At a minimum, the holes/pits will be filled in and contoured.

- Prior to and after each shot, the Demolition Shot Record is to be filled out by the DS with all applicable information.

1.6.2 Electric Detonator Use

The following requirements are necessary when using electric detonators and blasting circuits:

- Electric detonators and electric blasting circuits may be energized to dangerous levels from outside sources such as static electricity, induced electric currents and radio transmission equipment. Safety precautions will be taken to reduce the possibility of a premature detonation of an electric detonator and explosive charges of which they form a part. Demolition Team radios will not be operated while the pit/shot is primed or during the priming process.
- Demolition team members handling detonators will first ground themselves by bending down and touching the ground, which will discharge any static electricity.
- The shunt shall not be removed from the leg wires of the detonator until the continuity check.
- When uncoiling or straightening the detonator leg wires; keep the explosive ends of the detonator pointing away from the body and away from other personnel. When straightening the leg wires, do not hold the detonator itself; rather hold the detonator leg wires approximately one inch from the detonator body. Straighten the leg wires by hand, do not throw or wave the wires through the air to loosen them.
- Prior to use, the detonators shall be tested for continuity. To conduct the test, place the detonators in a pre-bored hole in the ground or place them in a sand bag and walk facing away from the detonators and stretch the wires to their full length, or to 25 feet, whichever is less, being sure to not pull the detonators from the hole or sand bag. With the leg wires stretched to their full length, test the continuity of the detonators one at a time by un-shunting the leg wires and attaching them to the galvanometer and checking for continuity. After the test, re-shunt the wires by twisting the two ends together. Repeat this process for each detonator until all detonators have been tested. This process shall be accomplished at least 50 feet down wind from any MEC/demolition materials and out of the personnel and vehicle flow patterns. In addition, all personnel on the demolition range/shot shall be alerted prior to the test being conducted. NOTE: When testing the detonator, prior to connecting the detonator to the firing circuit, the leg wires of the detonator must be shunted by twisting the bare ends of the wires together immediately after testing. The wires shall remain short circuited until time to connect them to the firing line.
- At the power source end of the blasting circuit, the ends of the firing line wires shall be shorted or twisted together (shunted) at all times, except when actually testing the circuit or firing the charge. The connection between the detonator and the circuit firing wires must not be made unless the power end of the firing wires are shorted and grounded or the firing panel is off and locked.

- The firing line will be checked using pre-arranged hand signals or through the use of two-way radios if the demolition pit/shot is not visible from the firing point. If radios are used, communication shall be accomplished a minimum of 50 feet from the demolition pit/shot and detonators. The firing line will be checked for electrical continuity in both the open and closed positions, and will be closed and shunted prior to connecting the detonator leg wires.
- MEC to be detonated or vented shall be placed in the demolition pit/shot and the demolition material placed/attached in such a manner as to ensure the total detonation and/or venting of the MEC. A section of detonation cord, time fuze, or Non-El shock tube will extend from the demolition material to a point outside the tamping material. Once the MEC and demolition material are in place and the shot has been tamped, the detonators will be connected to the demolition material. Prior to handling detonators that are connected to the firing line, personnel shall ensure that they once again ground themselves. The detonators will then be carried to the demolition pit/shot with the end of the detonators pointed away from the individual. The detonators are then connected to the detonation cord, Non-El, etc., ensuring that the detonator is not covered with tamping material to allow for ease of recovery/investigation in the event of a miss-fire.
- Prior to making connections to the blasting machine, the entire firing circuit shall be tested with a galvanometer for electrical continuity and ohmic resistance to ensure the blasting machine has the capacity to initiate the shot.
- The individual assigned to make the connections at the blasting machine or panel will not complete the circuit at the blasting machine or panel and will not give the signal for detonation until satisfied that all personnel in the vicinity have been evacuated to a pre-determined distance. When in use, the blasting machine or its actuating device shall be in the blaster's possession at all times. When using the panel, the switch must be locked in the open position until ready to fire, and the single key must be in the blaster's possession.
- Prior to initiating a demolition shot(s), a warning will be given, the type and duration of such will be determined by the prevailing conditions at the demolition range/shot. At a minimum, this should be an audible signal using a siren, air horn or megaphone, which is sounded for one minute duration, five minutes prior to the shot and again one minute prior to the shot.

1.6.3 Detonating Cord Use

The following procedures are required when using detonating cord (det cord):

- Det cord should be cut using approved crimpers and only the amount required should be removed from inventory.
- When cutting det cord, the task should be performed outside the magazine.
- For ease of inventory control, only remove det cord in one-foot increments.
- Det cord should not be placed in clothing pockets or around the neck, arm or waist, and should be transported to the demolition location in either an approved

"day box" or a cloth satchel, depending upon the magazine location and proximity to the demolition area.

- When ready to "tie in" either the det cord to demolition materials, or det cord to detonator, the det cord will be connected to the demolition material and secured to the MEC. The cord is then strung out of the hole/tamping material and secured in place with soil, being sure to leave a one-foot tail exposed outside the hole/tamping material.
- Once the hole is filled or tamping in place, make a loop in the det cord large enough to accommodate the detonator, place the detonator in the loop and secure it with tape. The detonator's explosive end will face down the det cord toward the demolition material or parallel to the main line.
- In all cases, ensure there is sufficient det cord extending out of the hole/tamping material to allow for ease of detonator attachment and detonator inspection/replacement should a misfire occur.
- If the det cord detonators are electric, they will be checked, tied in to the firing line and shunted prior to being taped to the loop as described above. If the det cord detonators are non-electric, the time/safety fuse will be prepared with the igniter in place prior to taping the detonators to the det cord loop. If the det cord detonators are Non-El, simply tape the detonators into the loop as described above.
- In the event that a time/safety fuse is used, and an igniter is not available and a field expedient initiation system must be used (i.e., matches), do not split the safety fuse until the detonator is taped into the det cord loop.

1.6.4 Shock Tube Splicing Procedures

The high reliability of the shock tube initiating system is due to the fact that all of the components are sealed and unlike standard non-electric priming components, cannot be easily degraded by moisture. Cutting the shock tube makes the open end vulnerable to moisture and foreign contamination, therefore care must be taken to prevent moisture and foreign matter from getting in the shock tubes exposed ends. Some general rules to follow are listed below.

- After cutting a piece of shock tube, either immediately tie a tight overhand knot in one or both cut ends or splice one exposed end and tie off the other.
- Always use a sharp knife or razor blade to cut shock tube so as to prevent the tube from being pinched or otherwise obstructed.
- Always cut shock tube squarely across and make sure the cut is clean.
- Use only the splicing tubes provided by the manufacturer to make splices
- Every splice in the shock tube reduces the reliability of the priming system; therefore keep the number of splices to a minimum.

1.6.4.1 Shock Tube Assembly

1. Step 1. If you are using a new role of shock tube cut off the sealed end, dispose of the small piece IAW local laws as they relate to flammable material and proceed

to the directions listed in Step 3. If you are using a pre-assembled shock tube/detonator assembly proceed to Step 1 in paragraph 1.6.4.2.

2. Step 2. If you are using a previously cut piece of shock tube, using a sharp knife or razor blade cut approximately 18 inches from the previously cut end, whether or not it was knotted IAW the above guidance. Dispose of the 18-inch piece of shock tube IAW local regulations.
3. Step 3. Using a sharp knife or razor cut the sealed end off of the detonator assembly and dispose of the small piece as above.
4. Step 4. Loosely tie the two shock tube ends to be sliced together in a square knot, leaving at least a two-inch free end of each end of the shock tube beyond the knot. Push the shock tube lightly to tighten the knot, but not so tight as to significantly deform the shock tube.
5. Step 5. Push one of the shock tube ends to be spliced firmly into one of the precut splicing tubes provided by the manufacturer, at least ¼ inches. Push the other shock tube end firmly into the other end of the splicing tube at least ¼ inches.
6. Step 6. Spool out the desired length of shock tube and cut it off with a sharp knife or razor blade.
7. Step 7. Immediately seal off the shock tube remaining on the spool by tying a tight overhand knot in the cut off end.

1.6.4.2 Firing Assembly Setup

1. Step 1. Lay out the required length of shock tube from demo area to firing point.
2. Step 2. If there are multiple items to be destroyed using bunch block(s), supplied by the manufacturer, lay out lead lines at demo site to the shot(s) and secure the bunch block with a sandbag, or some other item which will keep it from moving. Figure 1 illustrates the procedure.

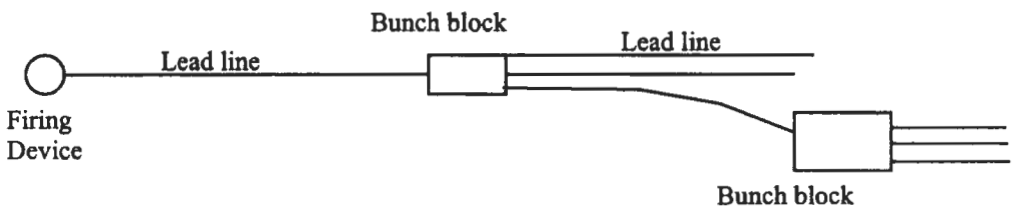

Figure 1

Note: No more than six leads may be used from any one bunch block.

3. Step 3. If the detonator assembly has not been attached yet then using the splicing tube, splice the detonator assembly to the shock tube lead line as explained in the splicing instructions above.

4. **Step 4.** If this is a non-tamped shot place the detonator assembly into the demolition material. If the shot is to be tamped then prepare the demolition material with a detonating cord lead long enough to stick out of the tamping at least one foot.
5. **Step 5.** Tape the detonator assembly to the detonating cord lead as shown in Figure 2.
6. **Step 6.** Clear the area IAW the approved demolition plan, return to the firing position.

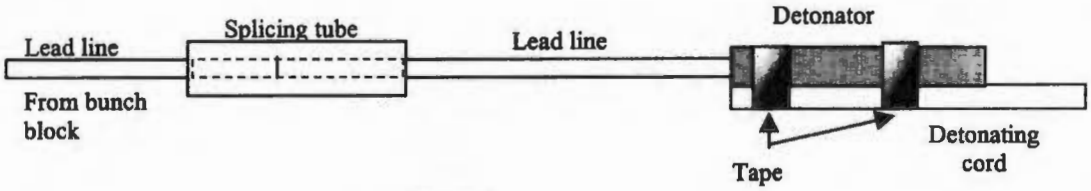

Figure 2

7. **Step 7.** Insert a primer into the firing device and connect the shock tube lead line to the firing device ensuring that the shock tube is properly seated in the firing device.
8. **Step 8.** Proceed IAW the approved demolition procedures.

1.6.5 Time/Safety Fuse Use

The following procedures are required when using a time/safety fuse:

- Prior to each daily use, the burn rate for the time/safety fuse must be tested to ensure the accurate determination of the length of time/safety fuse needed to achieve the minimum burn time of five minutes needed to conduct demolition operations.
- To ensure both ends of the time/safety fuse are moisture free, use approved crimpers to cut six inches off the end of the time/safety fuse roll and place the six inch piece in the time/safety fuse container.
- If quantity allows, accurately measure and cut off a six foot long piece of the time/safety fuse from the roll, and take the six-foot section out of the magazine and attach a fuse igniter.
- In a safe location, removed from demolition materials and MEC, ignite the time/safety fuse, measure the burn time from the point of initiation to the "spit" at the end, and record the burn time in the DS's Log.
- To measure the burn time, use a watch with a second hand, stop watch or chronograph.
- To calculate the burn rate in seconds per foot, divide the total burn time (in seconds) by the length (in feet) of the test fuse.
- Whenever using time/safety fuse, for demolition operations, the minimum amount of fuse to be used will be the amount needed to permit a minimum burn time of five minutes.

1.6.6 Perforator Use

The following procedures are required when using perforators:

- Only remove from inventory the number of perforators required to perform the task.
- Transport perforators in an approved "day box", cloth satchel or plastic container, depending upon magazine location and proximity to the demolition operations.
- When ready to use, place the det cord through the slot on the perforator and knot the det cord, ensuring the cord fits securely and has good continuity with the perforator.
- Once the det cord is secure, place the perforator in the desired location and secure it in place.
- Proceed from this point as described in paragraph 1.6.3.

1.6.7 Use of Two-Component Explosives

The following procedures are required when using two-component (binary) demolition materials:

- Only remove from inventory the amount of two-component required to perform the task.
- When transporting the solid and liquid, they need only be placed apart in the bed of a truck.
- Do not mix the solid and liquid components until certain that it will be used, since the resulting mixture is classified as a Class 1.1 explosive by Department of Transportation.
- When mixing the solid and liquids components, follow the manufacturer's instructions, while being sure to wear rubber gloves and goggles. Mix components in an area away from other demolition materials, the MEC, and if possible, sheltered from the wind.
- Once the components have been mixed, it is essential that the lid to the solid bottle be put on securely as soon as possible after mixing to prevent evaporation of the liquid.
- Attach the det cord as recommended by the manufacturer, place the assembled unit in the desired location in the hole/shot and secure the unit.
- Proceed from this point as described in paragraph 1.6.3.

1.6.8 Demolition Range/BIP Inspection Schedule

The demolition range/BIP inspection schedule outlined in Table 1-1 will be followed at all sites where demolition operations are being conducted. This inspection shall be conducted by the UXOSO and will be documented in the Site Safety Log. If any deficiencies are noted, demolition operations shall be suspended and the deficiency reported to the SUXOS and DS. Once the deficiencies are corrected, demolition operations may be resumed.

Table 1-1: Demolition Range Inspection Schedule

Check List Item	Inspection Schedule	Check List Item	Inspection Schedule
Site and Explosive Carrier Vehicle	Weekly or Prior to Use	Personal Protective Equipment	Prior to Use
Range Access/Egress Route	Weekly or Prior to Use	Circuit Testing Device	Prior to Use
Entrance Gate/Lock	Weekly or Prior to Use	Demolition Site	Prior to Use
Storage Trailer/Magazine	Daily, Prior to Use and After Use	Operating Equipment	Prior to Use
Fire Extinguishers	Daily, Prior to Use and After Use	Hospital Route	Prior to Use

1.7 METEOROLOGICAL CONDITIONS

In order to control the effects of demolition operations and to ensure the safety of site personnel, the following meteorological limitations and requirements shall apply to demolition operations:

- Demolition operations will not be conducted during electrical storms or thunderstorms.
- No demolition operations shall be conducted if the surface wind speed is greater than 20 miles per hour.
- Demolition operations will not be conducted during periods when visibility is less than one mile caused by, but not limited to, dense fog, blowing snow, rain, sand or dust storms.
- Demolition shall not be carried out on extremely cloudy days that are defined as: overcast (more than 80% cloud cover) with a ceiling of less than 2,000 feet.
- Demolition operations will not be conducted during any atmospheric inversion condition (low or high altitude).
- Demolition operations will not be conducted during periods of local air quality advisories.
- Demolition operations will not be initiated until 30 minutes after sunrise, and will be secured at least 30 minutes prior to sunset.

1.8 PRE-DEMOLITION/DISPOSAL PROCEDURES

1.8.1 Pre-Demo/Disposal Operational Briefing

It is the belief of Parsons that the success of any operation is dependent upon a thorough brief, covering all phases of the task, which is presented to all affected personnel. The DS will brief all personnel involved in range/shot operations in the following areas:

- Type of MEC being destroyed.

- Type, placement and quantity of demolition material being used.
- Method of initiation (electric, non-electric or Non-El).
- Means of transporting and packaging MEC, if applicable.
- Route to the disposal site.
- Emergency procedures.
- Equipment being used (i.e., galvanometer, blasting machine, firing wire, etc.).
- Misfire procedures.
- Post-shot clean-up of range.

1.8.2 Pre-Demo/Disposal Safety Briefing

The UXOSO and DS will conduct a safety brief for all personnel involved in range operations in the following areas:

- Care and handling of explosive materials.
- Personal hygiene.
- Two-man rule and approved exceptions.
- Potential trip/fall hazards.
- Horseplay on the range.
- Stay alert for any explosive hazards.
- Location of emergency shelter (if available).
- Vehicle parking (vehicles must be oriented out of the site for immediate departure, with keys in the ignition).
- Location of emergency vehicle (keep engine running).
- Wind direction (to assess potential toxic fumes).
- Location of first aid kit and fire extinguisher.
- Route to nearest hospital or emergency aid station.
- Type of communications in event of an emergency.
- Storage location of demolition materials and MEC awaiting disposal.

1.8.3 Task Assignments

Individuals with assigned tasks will report the completion of the task to the DS. The types of tasks that may be required are:

- Contact local Police, Fire department, USCG and FAA as required.
- Contact hospital/emergency response personnel if applicable.
- Secure all access roads to the range/shot area.
- Visually check range/shot area for any unauthorized personnel.
- Check firing wire for continuity and shunt.
- Prepare designated pits/shots as required.
- Check continuity of detonators.
- Check time/safety fuse and its burn rate.

- Designate a custodian of the blasting machine, fuse igniters or Non-El initiator.
- Secure detonators in a safe location.
- Place MEC in pit, if applicable, and place charge in desired location.

1.8.4 Preparing Explosive Charge for Initiation

To prepare the explosive charge for initiation, the procedures listed below will be followed:

- Ensure firing wire is shunted.
- Connect detonator to the firing wire.
- Isolate or insulate all connections.
- Prime the demolition charge.
- Place demolition charge on MEC.
- Depart to firing point (if using non electric firing system, obtain head count, pull igniters and depart to designated safe area).
- Obtain a head count, and test blast machine for proper operation.
- Warning Signal: Give a one-minute series of long audible signals 5 minutes prior to the shot, using a bullhorn, vehicle horn or siren. Ideally, there will be a 10-second signal followed by 10-seconds of silence. This sequence will be repeated three times for a total of one-minute.
- Blast Signal: a series of short audible signals 1-minute prior to the shot. This sequence is a 5-second blast followed by 5-seconds of silence repeated twice.
- Check the firing circuit with a galvanometer.
- Yell "fire in the hole" three times (or an equivalent warning) and take cover.
- If using electric firing system connect firing wires to blasting machine and initiate charge.
- Remove firing wires from blasting machine and shunt.
- All Clear Signal: a prolonged audible signal following the inspection of the blast area. All personnel with the exception of the DS and UXOSO remain in designated safe area until DS announces "All Clear". This will occur after a post-shot waiting period of 5-minutes and the UXOSO has and inspected the pit(s)/shot(s).

1.9 POST DEMOLITION/DISPOSAL PROCEDURES

Do not approach a smoking hole or allow personnel out of the designated safe area until cleared to do so, and follow the below listed procedures:

- After the "All Clear" signal, check pit/shot for low orders or kick outs.
- Check pit with a magnetometer and remove any large fragmentation.
- Any MEC items, failing to be properly disposed of, discovered during the post demolition procedures, will be destroyed prior to the end of the day.
- Backfill hole as necessary.
- Police up all equipment.

- Notify police, fire, etc. that the operation is complete.

1.10 MISFIRE PROCEDURES

A thorough check of all equipment, firing wire and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below shall be followed.

1.10.1 Electric Misfires

To prevent electric misfires, one technician will be responsible for all electrical wiring in the circuit. If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below:

- Check firing line and blasting machine connections and make a second initiation attempt.
- If unsuccessful, disconnect and connect to another blasting machine (if available) and attempt to initiate charge.
- If unsuccessful, commence a 60-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the UXOSO will proceed down range to inspect the firing system, and a safety observer must watch from a protected area.
- Disconnect and shunt the detonator wires from the leg wires, connect a new detonator to the firing circuit, check the replacement detonator for continuity, and prime the charge without disturbing the original detonator.
- Follow normal procedures for effecting initiation of the charge.

1.10.2 Non-Electric Misfires

Working on a non-electric misfire is the most hazardous of all operations. Occasionally, despite all painstaking efforts, a misfire will occur. Investigation and corrective action should be undertaken only by the technician that placed the charge, using the following procedure:

- If charge fails to detonate at the determined time, initiate a 60-minute wait period plus the time of the safety fuse, i.e., 5-minute safety fuse plus 60 minutes for a total of 65 minutes.
- After the wait period has expired, the designated technician will proceed down range to inspect the firing system. A safety observer must watch from a protected area.
- Prime the shot with a new non-electric firing system and install a new fuse igniter.
- Follow normal procedures for initiation of the charge.

1.10.3 Non-EL Misfire

The most common cause of misfires is known as "black tube failure". The shock tube propagates up to the detonator but the detonator fails to function, or there is a crimp

in the line causing the shock wave to be interrupted. The following steps will be taken in the event of a misfire:

- If the shock tube fails to propagate and the tube remains clear, remove the shock tube from the firing device, cut off six inches of the shock tube, insert a new primer, re-insert the shock tube ensuring that it is properly seated and re-fire. If when you activate the firing device and the shock tube gets blown out of the firing device without activating, cut off six inches of the shock tube, replace the primer and re-insert the shock tube into the firing device.
- If the primer functioned properly and the shock tube was heard or seen to fire, observe the standard one-hour waiting period prior to going downrange.
- After the one-hour waiting period has passed, proceed downrange and check the first component in the priming train i.e. splice, bunch block or detonator assembly. Repeat this process till you reach the detonator assembly. As you conduct this inspection and discover the problem, replace the firing train, which functioned (tube is no longer clear) with a new one and ensure that all the connections are correct and secure.
- After the system has been checked and repaired/replaced return to the firing point and repeat the firing process.

1.10.4 Detonating Cord Misfire

Parsons uses det cord to tie in multiple demolition shots and to ensure that electric detonators are not buried. Since det cord initiation will be either electrical or non-electrical, the procedures presented in paragraphs 1.10.1, 1.10.2, or 1.10.3, as appropriate to the type of detonator used, will be used to clear a det cord misfire. In addition, the following will be followed:

- If there is no problem with the initiating system, wait the prescribed amount of time and inspect the initiator to the cord connection to ensure it is properly connected. If it was a bad connection simply attach a new initiator and follow the appropriate procedures in paragraph 1.6.0.
- If the initiator detonated and the cord did not, inspect the cord to ensure it is det cord and not time fuze. Also, check to ensure there is PETN in the cord at the connection to the initiator.
- It may be necessary to uncover the det cord and replace it. This must be accomplished carefully to ensure that the demolition charge and the MEC item are not disturbed.

1.10.5 Perforator Misfire

The use of perforators is considerably safer than the use of C-4 and many other demolition materials. If the perforator is not initiated properly, it could malfunction. Since the perforator is covered with tamping material, det cord is used as the initiator. Therefore, in the event of a misfire, the procedures presented in paragraph 1.10.4 will be followed, along with the items presented below:

- If everything went but the perforator, one of four things has occurred:
  1. Det cord grain size was insufficient to initiate the perforator;

- Check to ensure the grain size of the det cord is sufficient, with 80-grain size or greater being the recommended size.

2. The det cord was dislodged from the perforator when placing tamping materials;
   - If the det cord connection to the perforator was the problem, ensure that the next connection is secured (use duct tape if necessary).
3. The perforator was defective;
4. The perforator was moved during the placement of tamping materials.

- If it is evident that the perforator was moved, ensure it is properly secured for the next shot.
- If cord size and connection are sufficient, replace the perforator, leaving the defective one on the shot.

1.11 RECORD KEEPING REQUIREMENT

To document demolition operations and the destruction of MEC, the following record keeping requirements shall be met:

- Parsons will obtain and maintain all required permits.
- The DS will ensure the accurate completion of the logs, and the SUXOS and UXOQCS will monitor the entries in the log for completeness, accuracy and compliance with meteorological conditions.
- The DS shall enter the appropriate data on the Demolition Shot Record, to reflect the MEC destroyed, and shall complete the appropriate information on the Magazine Data Card, which indicates the demolition materials used.
- The quantities of MEC recovered must also be the quantities of MEC destroyed or disposed of as munitions debris or munitions constituents.
- Parsons and/or its subcontractors will retain a permanent file of all Demolition Records, including permits, Magazine Data Cards, training records, inspector reports, waste manifests if applicable, and operating logs.
- Copies of ATF License and any state or local permits must be on hand.

1.12 SAFETY AND PPE REQUIREMENTS

The following safety measures and personal protective equipment shall be used in preventing or reducing exposure to the hazards associated with MEC demolition/disposal operations. These requirements will be implemented unless superseded by site-specific requirements stated in the Accident Prevention Plan (APP):

- Steel-toed safety boots will not be worn by demolition team personnel conducting demolition/disposal operations, unless a toe crush hazard exists, in which case personnel will wear boots with plastic or fiber toed safety toes;
- Unless a serious head, eye or face hazard exists, demolition team personnel will not be required to wear hard hats, safety glasses or face shields when

conducting operations involving the handling of demolition explosives or MEC, except as stated previously; and

- In the event that a serious head, eye or face hazard does exist, demolition team personnel will wear the required PPE, but positive restraining means shall be required to secure the PPE to the head, face etc. and prevent it from falling and causing an accidental detonation.

1.13 AUDIT CRITERIA

The following items related to demolition/disposal operations on an MEC contaminated site will be audited to ensure compliance with this SOP:

- Demolition Shot Record
- Site Daily Operational and Safety Logs;
- MEC Operations Daily/Weekly Report;
- Safety Training Attendance Forms, for the initial site hazard training;
- Safety Training Attendance Forms, for the Daily Tailgate Safety Briefings;
- Daily Safety Inspection and Audit Log.

1.14 ATTACHMENTS

The following attachment to this SOP will be reviewed by all UXO-qualified personnel participating in demolition/disposal activities.

- Attachment 1 - "Procedures for Demolition of Multiple Rounds Consolidated Shots on Ordnance and Explosives (OE) Sites"
- Attachment 2 - Use of Sandbags for Mitigation of Fragmentation and Blasts Effects due to Intentional Detonation of Munitions (HNC-ED-CS-S-98-7)
- Attachment 3 - Use of Water for Mitigation of Fragmentation and Blasts Effects due to Intentional Detonation of Munitions (HNC-ED-CS-S-00-3)

ATTACHMENT 1

PROCEDURES FOR DEMOLITION OF MULTIPLE ROUNDS (CONSOLIDATED SHOTS) ON ORDNANCE AND OE SITES

US Army Corps of Engineers
Engineering and Support Center, Huntsville

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

AUGUST 1998 (Terminology Update March 2000)

DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
2461 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22331-0600

OCT 27 1998

DDESB-KO

MEMORANDUM FOR DIRECTOR US ARMY TECHNICAL CENTER FOR EXPLOSIVES SAFETY (ATTENTION: SIOAC-ES)

SUBJECT: Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites

References: (a) Memorandum from SIOAC-ESL to Chairman DDESB (ATTN: DDESB-KO), 14 September 1998, SAB

(b) M. Crull and Wayne Shaw, US Army Corps of Engineers, Huntsville, "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites" (August 1998)

The subject procedures forwarded by reference (a) and defined in reference (b) have been reviewed with respect to explosives safety criteria. Based on the information furnished, the procedures proposed in reference (b) for the demolition of consolidated ordnance at OE sites are approved.

Point of contact is Dr. Chester E. Canada, DDESB-KT2 (PH: 703-325-1369, FAX: 703-325-6227, E-MAIL: canadce@hqda.army.mil).

for DANIEL T. TOMPKINS
Colonel, USAF
Chairman

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

August 1998

Prepared By

Michelle Crull, PhD, PE
Department of the Army
Huntsville Center, Corps of Engineers
Attn: CEHNC-ED-CS-S
P.O. Box 1600
Huntsville, AL 35807-4301
Telephone: Commercial 256-895-1653
And
Wayne Shaw
Department of the Army
Huntsville Center, Corps of Engineers
Attn: CEHNC-OE-CX
P.O. Box 1600
Huntsville, AL 35807-4301
Telephone: Commercial 256-895-1513

Reviewed by: _____ 8/27/98
Chief, Structural Branch — Date

Reviewed by: _____ 8/27/98
Chief, Civil-Structures Division — Date

Reviewed by: _____ 8/27/98
Chief, OE Center of Expertise — Date

Reviewed by: _____ 8/31/98
Chief, Ordnance & Explosives Team — Date

Reviewed by: _____ 9/2/98
Chief, OE Safety — Date

FOREWORD

The terminology in this report has been updated (March 2000) to reflect terminology used in the field. Specifically the term "personnel separation distance" has been replaced with the term "minimum separation distance for intentional detonations." This is a change in terminology only, no change in content.

Per discussions with Dr. Chester Canada, Department of Defense Explosives Safety Board (DDESB) and Mr. Cliff Doyle, U.S. Army Technical Center for Explosives Safety (USATCES) this report is not re-submitted to the DDESB for approval.

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LIST OF FIGURES

1.0 Introduction

The U.S. Army Engineering and Support Center, Huntsville (USAESCH) includes the Ordnance and Explosives Center of Expertise (OE-CX). Part of the OE-CX mission is development of procedures for removal and destruction of munitions found on OE sites. Standard procedures are to destroy the munitions by detonation on site. This includes both single round detonation in-place and multiple round detonation (or consolidated shots) at a pre-determined location. The procedures for multiple round detonation are described in this paper.

There are two situations that may describe the consolidated shot process: 1) munitions may be collected from anywhere on site and detonated at a designated, sited disposal area or 2) munitions may be collected within a grid and detonated at a designated spot within the grid. In either situation the same procedures, as described in the following paragraphs, must be followed.

2.0 Placement of Munitions

Munitions shall be placed with their sides touching such that their axis is horizontal as shown in Figure 1. The munitions shall be placed so that the nose of each munition is pointing in the same direction. Munitions shall be oriented so that lugs and/or strong-backs, and nose and/or tail plate sections are facing away from personnel locations.

Figure 1 – Placement of Munitions for Consolidated Shots

3.0 Minimum Safe Separation Distance for Intentional Detonations

3.0.1 This document covers procedures for intentional detonations only.

3.0.2 In accordance with DoD 6055.9-STD Chapter 5 paragraph E.4.a(2), the minimum safe separation distance for all personnel will be the greater of the overpressure distance or the appropriate fragment range as determined by the maximum fragment range or the mitigated fragment range.

3.1 Overpressure Distance

In accordance with DoD 6055.9-STD Chapter 5 paragraph E.4.a(2), the allowable overpressure distance will be determined as the scaled distance, K328, based on the total net explosive weight (NEW) of all munitions plus the initiating explosives.

3.2 Fragment Criteria

3.2.1 Maximum Fragment Range

The maximum fragmentation characteristics shall be computed in accordance with HNC-ED-CS-S-98-1. The maximum fragment range shall be computed using these fragmentation characteristics with a trajectory analysis such as the computer software TRAJ. The maximum fragment range shall be the maximum fragmentation distance computed for the most probable munition (MPM) for an OE area at a site, and this shall be the maximum fragment range for a consolidated shot.

3.2.2 Fragment Mitigation

Fragment mitigation may be provided by an appropriate Department of Defense Explosives Safety Board (DDESB) approved engineering control. Typical engineering controls for intentional detonation include tamping and sandbags. The design of such an engineering control shall be based on the maximum fragmentation characteristics of the MPM. The NEW used for the design of the engineering control shall be the total NEW of all munitions plus the initiating explosives. Engineering controls not already approved by DDESB may be submitted (along with appropriate technical data) as part of a site specific explosive safety submission for use at that site. Engineering controls will not be put into use until approved by DDESB and specific applications verified by the appropriate agency; for example, the OE-CX verifies applications for U.S. Army Corps of Engineers.

4.0 Initiation

The consolidated shot shall be initiated in such a manner that detonation of all munitions is simultaneous.

5.0 References

DoD 6055.9-STD, "Department of Defense Ammunition and Explosives Safety Standards", August 1997.

HNC-ED-CS-S-98-1, Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives, January 1998.

Memorandum, DDESB, DDESB-KO, 27 January 1998, subject: Guidance for Clearance Plans.

ATTACHMENT 2

MITIGATION OF BLAST AND FRAGMENTATION USING SANDBAGS

US Army Corps of Engineers
Engineering and Support Center, Huntsville

Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions

HNC-ED-CS-S-98-7
AUGUST 1998

DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
2461 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22331-0600

DDESB-KO

23 February 1999

MEMORANDUM FOR DIRECTOR US ARMY TECHNICAL CENTER FOR EXPLOSIVES SAFETY (ATTENTION: SIOAC-ES)

SUBJECT: Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonations of Munitions, Report HNC-ED-CS-S-98-7 (August 1998)

References: (a) SIOAC-ESL memorandum, dated 30 Nov 98, same subject

(b) Joseph M. Serena and Michelle Crull, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonations of Munitions, Report HNC-ED-CS-S-98-7," (August 1998)

The subject site plan forwarded by reference (a) has been reviewed with respect to explosives safety criteria. The site plan addresses the use of sandbags, IAW reference (b) to mitigate hazards and protect personnel from intentional detonations of munitions up to the 155-mm M107. Based on the information furnished, the proposed use of sandbags for intentional detonations at ordnance and explosives (OE) sites, IAW reference (b) is approved.

A copy of this site plan package and this letter of approval must be available at OE sites where intentional detonations are conducted that use procedures of this siting package.

Point of contact is Dr. Chester E. Canada, DDESB-KT2 (PH: commercial: 703-325-1369, FAX: 703-325-6227, E-MAIL: canadce@hqda.army.mil).

Daniel T. Tompkins

DANIEL T. TOMPKINS
Colonel, USAF
Chairman

cc:
Army Safety Office, ATTN: DACS-SF, Chief of Staff, 200 Army Pentagon, Washington, DC 20310-0200
Commander, U.S. Army Corps of Engineers, ATTN: CESO, 20 Massachusetts Avenue NW, Washington DC 20314-1000
Commander, U.S. Army Engineering and Support Center Huntsville, ATTN: CEHNC-ED-CS and CEHNC-OE-CX-Q, P.O. Box 1600, Huntsville, AL 35807-4301

Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions

Prepared by
Joseph M. Serena, III, PE
Michelle Crull, PhD, PE

August 1998

Department of the Army
Huntsville Center, Corps of Engineers
Attn: CEHNC-ED-CS-S
P.O. Box 1600
Huntsville, AL 35807-4301
Telephone: Commercial 256-895-1650

Reviewed by: _____ 8/13/98
WALLACE WATANABE Date
Chief, Structural Branch

Reviewed by: _____ 8/[illegible]/98
PAUL M. LAHOUD, PE Date
Chief, Civil-Structures Division

EXECUTIVE SUMMARY

The U.S. Army Engineering and Support Center, Huntsville (USAESCH) is currently engaged in projects which require the disposal of uncovered/discarded ordnance and explosives (OE) on public and private lands. The uncovered OE item is often detonated in place if it is too dangerous to move. In some cases, covering and tamping with loose earth is used to contain the blast and fragments. Another method to mitigate the fragmentation and blast effects is to cover the item with sandbags. However, traditionally there has been no method to determine the optimum configuration or the required thickness of such a sandbag enclosure.

The Structural Branch, USAESCH, sponsored a test program in 1997 to evaluate the use of sandbag enclosures for fragment and blast mitigation, for intentional detonations at Ordnance and Explosives (OE) sites. Southwest Research Institute (SwRI), under contract to USAESCH, performed a two phase test program of sandbag enclosures. In phase one, the preliminary explosive test phase, four tests on a 155-mm projectile were performed to refine and optimize the test procedure. This test procedure was used in phase two, the comprehensive explosive test phase. In phase two, a total of fourteen tests with five different munitions were performed to determine the thickness of sandbags required to capture all primary fragments. Measurements were made of the overpressures at various places, sandbag throw distances, depth of fragment penetration, and noise levels. High-speed film cameras, video recorders and digital cameras were used to visually record the events.

Required Wall and Roof Thicknesses for Sandbag Enclosures, with Expected Sandbag Throw Distances and Pressures, for Five Tested Munitions

Munition	Charge Weight, Comp B, lb	Required Wall and Roof Sandbag Thickness, in	Expected Maximum Sandbag Throw Distance, ft	Expected Peak Pressure @ 40 feet, psi	Expected Peak Pressure @ 80 feet, psi	Expected Sound Level @ 100 feet, dB
155-mm M107	15.4	36	220	0.18	0.09	115
4.2-in M329A2	8.17 (TNT)	24	125	0.16	0.06	116
105-mm M1	5.08	24	135	0.18	0.08	120
81-mm M374A2	2.1	20	125	0.14	0.05	119
60-mm M49A3	0.43	12	25	0.08	0.03	118

The results of these tests have been used to develop guidelines for the use of sandbag enclosures. The guidelines include required sandbag thicknesses, configuration and construction of the sandbag enclosures, and withdrawal distances based on the greater of sandbag throw distances or 200 ft. This document provides a summary of the test results and these guidelines.

LIST OF FIGURES

1.0 Introduction

The U.S. Army Engineering and Support Center, Huntsville (USAESCH) is currently engaged in projects which require the disposal of uncovered/discarded ordnance and explosives (OE) on public and private lands. The uncovered OE item is often detonated in place if it is too dangerous to move. In some cases, covering and tamping with loose earth is used to contain the blast and fragments. Another method to mitigate the fragmentation and blast effects is to cover the item with sandbags. However, traditionally there has been no method to determine the optimum configuration or the required thickness of such a sandbag enclosure.

The Structural Branch, USAESCH, sponsored a test program in 1997 to evaluate the use of sandbag enclosures for fragment and blast mitigation, for intentional detonations at Ordnance and Explosives (OE) sites. Southwest Research Institute (SwRI), under contract to USAESCH, performed a two phase test program of sandbag enclosures. In phase one, the preliminary explosive test phase, four tests on a 155-mm projectile were performed to refine and optimize the test procedure. This test procedure was used in phase two, the comprehensive explosive test phase. In phase two, a total of fourteen tests with five different munitions were performed to determine the thickness of sandbags required to capture all primary fragments. Measurements were made of the overpressures at various places, sandbag throw distances, depth of fragment penetration, and noise levels. High-speed film cameras, video recorders and digital cameras were used to visually record the events.

The results of these tests have been used to develop guidelines for the use of sandbag enclosures. The guidelines include required sandbag thicknesses, configuration and construction of the sandbag enclosures, and withdrawal distances based on the greater of sandbag throw distances or 200 ft. This document provides a summary of the test results and these guidelines.

2.0 Test Program

2.1 Fragmentation Characteristics of Munitions

Prior to beginning this test program the fragmentation characteristics of a variety of munitions frequently encountered during OE site operations were determined. The fragmentation characteristics were calculated in accordance with procedures outlined in TM5-1300, "Structures to Resist the Effects of Accidental Explosions" [1] and detailed in CEHNC-ED-CS-S-98-1, "Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives" [2]. The fragmentation characteristics were used to predict preliminary thicknesses of sand required to prevent perforation for the five munitions tested.

Optimally, the fragments from the munition will strike the sandbags before the blast wave so that the fragments are penetrating undisturbed sand. To ensure that this will occur it is necessary to reduce the coupling between the explosive charge and the

surrounding soil. This coupling is dependent on the separation distance between the charge and the soil. Full coupling implies that the maximum amount of energy, or velocity, is transferred from the explosive into the soil immediately adjacent to the charge. If an explosive charge is placed in a cavity, so that an air gap exists between the charge and the walls of the cavity, coupling between the explosive and soil is reduced. Therefore, a standoff of some distance is required to reduce the coupling effect. Calculations to determine the velocity of sand particles from a buried explosion were performed. The velocity of the sand particles was compared to the velocity of the design fragment through sand. These calculations suggest that at a distance between 6 and 12 inches from the explosion, the fragment velocity exceeds the particle velocity. Therefore, the initial standoff distances for the tests were 6 and 12 inches.

2.2 Preliminary Explosive Test Phase

In the preliminary explosive tests, four tests of statically detonated 155-mm M107 projectiles were performed. These tests provided the data needed to specify the amount and configuration of sandbags that are required to safely detonate a 155-mm projectile in place, verified that the general test procedure was satisfactory, and defined the instrumentation and data acquisition systems for the subsequent comprehensive explosive tests. Figure 1 shows the site layout for the tests of sandbag enclosures. Although, munitions are rarely oriented vertically for demolition in place, the vertical orientation provided the opportunity to evaluate a greater number of combinations of wall thicknesses and standoff distances. Figures 2 and 3 show the sandbag enclosure configurations for vertical and horizontal weapon tests.

The test matrix for the preliminary explosive tests is shown in Table 1. Two tests were run with the 155-mm in the vertical orientation and two in the horizontal orientation. Each test allowed five standoff distances and five sandbag thicknesses to be evaluated.

The sandbags were made of woven polypropylene, as is commonly used by explosives and ordnance disposal (EOD) personnel, and the volume/weight of the sandbags was either 0.5 ft^3/50 lbs for the large bags or 0.25 ft^3/25 lbs for the small bags. The small bags were used for test two. No additional information was provided by using the small bags so these were not used for any other tests. The bags were filled with a "washed river" sand that was judged to be "typical" by a local soil consultant (Fugro-McClelland Southwest, Inc.).

To determine the sandbag throw distribution some of the sandbags in the first two tests were filled with sand colored with dye. The dye did not improve the quality of the test results. Spray paint was used in the subsequent tests to mark each bag with its original position in the sandbag enclosure. A different color was used to indicate the wall or the roof and numbers were used to indicate the layer in which the sandbag was located.

Detailed descriptions of all tests and results are provided in "Evaluation of Sandbags for Fragment and Blast Mitigation" by Southwest Research Institute [3].

Table 1 – Test Matrix for Preliminary Explosive Tests

Test No.	Orientation	Standoff, in.					Wall Thickness, in. (Bag Size)				Wall Height, in. (Bag Size)	
		S_1	S_2	S_3	S_4	S_R	T_1	T_2	T_3	T_4	H_1	H_2
155-1	Vertical	12	6	6	12	6	32	32.5	45	43	32	20
155-2	Vertical	6	6	6	6	6	18(s)	54	18(s)	53(s)	32	22
155-3	Horizontal	6	6	6	6	6	30	48	24	24	12	30
155-4	Horizontal	6	6	6	6	6	35	36	34	36	12	36

Note: All walls were constructed with large bags, except for those designated with an "s" for small bags.

2.2.1 Preliminary Explosive Test Results

For tests 1 and 2, the 155-mm M107 projectile was detonated using a donor charge of 200 g of C-4 placed in the fuze well and initiated with an Exploding Bridge Wire. For tests 3 and 4, the 155-mm M107 projectile was detonated using a well perforator shaped charge. This approach is typically used for on-site detonations. Time of arrival (TOA) pins were used for all tests to determine if a high order detonation was achieved.

All detonations were high order and results were obtained. The make screens and their frames and the assorted witness screens were scattered across the site. Where possible, each screen was identified and photographed and the number of fragment holes or the condition of the screen was recorded. The results of the first three tests suggested that a wall and roof thickness of 36 inches should be sufficient to contain all of the fragments and to reduce the overpressure levels. The dimensions of test 4 confirmed this configuration.

From the limited data collected on standoff distance, it appears that for standoffs of 6 and 12 inches there is no difference in the thickness of sandbags required to stop fragments. Test 2 showed that the size of the sandbag did not affect the fragment penetration. Test 3 showed that the horizontal orientation of the munition did not greatly effect the fragment penetration. Tests 3 and 4 showed that the base plate of the munition broke up and was stopped by 24 inches or less of sandbags.

The data collected showed that approximately 20 inches of sandbags will completely contain the fragments from the 155-mm M107 projectile. The only indications of fragments exiting the sandbag enclosure came from the two identical 18 inch walls of test 2 (external witness screens on sides 1 and 3 both registered fragment impacts). Internal witness screens at depths of 20 inches to 24 inches for all 4 tests did not indicate any fragment impacts. In tests 2 through 4, the roof witness screens also showed no penetrations for 20 to 36 inches of roof depth. The CONWEP software [4] predicts that 24 inches of sand will stop the design fragment from the 155-mm M107 projectile.

Sandbag throw distances were recorded in 10 foot increments from ground zero to the furthest sandbags. The maximum sandbag throw distances were 150 feet, 191 feet, 157 feet, and 150 feet for tests 1 through 4, respectively. All of the furthest thrown sandbags came from the roof. In most cases, the roof sandbags were found relatively intact while the wall sandbags were often disintegrated. The bulk of the sandbags fell within 100 feet with only a few beyond this distance. An examination of the sandbag throw distances show that the standoff, the size of the bag, and the weapon orientation did not affect the throw distance to any significant degree.

Blast overpressures were recorded for all 4 tests (see Table 2). As shown, the sandbag enclosures greatly reduced the magnitude of the pressure. In test 3, a digital sound meter was placed 100 feet from ground zero and the maximum sound level recorded was 114.7 decibels.

Table 2 – Blast Overpressures from Preliminary Explosive Tests

Test No.	Side 1				Side 4			
	P1 @ 40', psi	P2 @ 40', psi	P3 @ 80', psi	P4 @ 80', psi	P5 @ 40', psi	P6 @ 40', psi	P7 @ 80', psi	P8 @ 80', psi
155-1	0.67	0.71	ND	ND	0.37	0.38	ND	ND
155-2	1.31	1.18	ND	ND	0.74	0.97	ND	ND
155-3	0.16	0.16	0.07	0.06	0.16	0.18	0.09	ND
155-4	0.04	0.04	0.03	0.03	0.07	0.08	ND	0.05

ND = no data

2.3 Comprehensive Explosive Tests

An additional fourteen tests were performed: one more using 155-mm M107 projectiles, four using 105-mm M1 projectiles, three using 4.2-in M329A2 projectiles, four using 81-mm M374A2 mortars, and two using 60-mm M49A3 mortars. The test matrix for the comprehensive explosive tests is shown in Table 3. For all tests performed with the munition in the vertical orientation, detonation was achieved using a donor charge of 100 grams (50 grams for test 60-1) of C-4 in the fuze well. For all tests performed with the munition in the horizontal orientation, detonation was achieved using a well perforator. TOA pins were used for all tests to check if a high order detonation was achieved.

For each of the comprehensive explosive tests, woven polypropylene 0.5 ft^3 sandbags were filled with 50 lbs of washed river sand. The sandbags were painted and numbered as described in Section 2.2 to indicate their original position in the sandbag enclosure. Moisture content was not controlled nor monitored during the test program.

Pressure gages, a sound meter, high speed cameras, digital cameras and video cameras were used for data acquisition during each test. Internal and external witness screens were used to determine how deeply the fragments moved into the sandbag mass and whether any fragments exited the sandbag enclosure.

Table 3 – Test Matrix for Comprehensive Explosive Tests

Test No.	Orientation	Standoff, in.					Wall Thickness, in.				Wall Height, in.	
		S_1	S_2	S_3	S_4	S_R	T_1	T_2	T_3	T_4	H_1	H_2
155-5	Horizontal	7	7	5	6	7	36	36	36	36	13	36
4.2-1	Vertical	5.5	5.5	5.5	5.5	6	20	24	31	36	19	24
4.2-2	Horizontal	6.5	6.5	6	6	7	24	25	24	24	11	24
4.2-3	Horizontal	6	5	5	6	7	24	25	25	24	11	24
105-1	Vertical	5.5	5.5	5.5	5.5	6	20	26	31	35	25	24
105-2	Vertical	0	0	4	6	6	29	25	19	25	26	23
105-3	Horizontal	7	5	5	5	9	24	24	24	24	13	24
105-4	Horizontal	6.5	6	5	6	7	25	25	24	24	11	23
81-1	Vertical	5	5	6	6	6	12	19	23	30	15	18
81-2	Horizontal	7	6	5.5	7	6	18	24	18	24	9	18
81-3	Horizontal	7	6	5	6	7	18	19	18	19	10	18
81-4	Horizontal	6	5.5	5.5	5.5	8	19	20	19	20	11	18
60-1	Vertical	6	6	6	6	6	13	19	23	30	11	12
60-2	Horizontal	6.5	3	5.5	3	6	12	12	12	12	8	13

All detonations were high order and results were obtained. The assorted witness screens were scattered across the site. Where possible, each screen was identified and photographed and the number of fragment holes or the condition of the screen was recorded. Sandbag throw distances were recorded in 10 foot increments from ground zero to the furthest sandbags. Blast overpressures were recorded for all tests at 40 feet and 80 feet from ground zero. A digital sound meter was placed 100 feet from ground zero. A summary of the results is shown in Table 4.

The final test for each munition was a confirmation test. These included tests 155-5, 4.2-3, 105-4, 81-3 and 60-2. The purpose of the confirmation tests was to model as closely as possible the actual use of sandbags in field conditions. In each test the internal witness screens were omitted. Sandbags were staggered both horizontally and vertically. External witness screens were placed over the roof and the two sides facing away from the pressure gages. After each test, the external witness screens were recovered and inspected for fragment penetrations. No such penetrations were identified. Therefore, the sandbag thicknesses defined in Table 4 are those used in the confirmation tests. For two munitions, the penetration data from internal witness panels suggests that somewhat smaller sandbag thicknesses may be sufficient to capture all fragments. As stated above for the 155-mm M107, internal witness screens show no fragment penetrations for sandbag thicknesses of about 24 inches or more. For the 4.2-inch M329A2 mortar, the internal witness screens show no fragment penetrations deeper than about 18 inches. However, the thicknesses of 36 inches for the 155-mm M107 and 24 inches for the 4.2-inch M329A2 are retained for use in the field, since sandbag throw distances are based on these thicknesses. While possibly thicker than necessary from capturing fragments, the increased total mass of the sandbags results in reduced sandbag throw distances.

Detailed descriptions of all tests and results are provided in "Evaluation of Sandbags for Fragment and Blast Mitigation" by Southwest Research Institute [3].

3.0 Guidelines for Use of Sandbags

3.1 Enclosure Geometry

Table 5 summarizes the results of the tests. This table specifies the minimum thickness of sandbag walls and roof that is needed to completely contain the fragments for the five munitions that were tested in this project. It also gives the expected maximum sandbag throw distances, the peak pressures at 40 feet and 80 feet, and the sound level at 100 feet, for the five munitions. For safety and conservatism, the expected sandbag throw distances are approximately 10% larger than the largest distances actually measured in the tests. Thus, the expected sandbag throw distances given in Table 5 are conservative in two ways: first, the largest measured sandbag throw distance from all tests of a particular round is used and second, this value is increased by 10%. Due to the already low values of peak pressures, a similar increase in the expected peak pressures was not deemed necessary or justified.

Table 4 – Summary of Results from Comprehensive Explosive Tests

Munition	Sandbag Thickness (in) to Defeat Fragments	Max. Sandbag Throw Distance (ft)		Max Peak Overpressure (psi) @ 40 ft		Max Peak Overpressure (psi) @ 80 ft		Max Noise Level (dB) a 100 ft
		Side of Round	Nose/Tail of Round	Side of Round	Nose of Round	Side of Round	Nose of Round	
155-mm M107	36	200	130	0.06	0.12	0.04	0.05	114.7
4.2-in M329A2	24	110	70	0.12	0.14	0.04	0.06	115.8
105-mm M1	24	120	50	0.17	0.18	0.07	0.08	119.3
81-mm M374A1	20	110	30	0.14	0.08	0.05	0.03	118.3
60-mm M49A3	12	20	20	0.06	0.08	0.02	0.03	117.3

Obviously, the five munition types do not cover all of the munitions that may be encountered. To determine the minimum wall and roof thickness for a particular shell other than those found in Table 5, the approach is as follows:

(1) Determine the initial fragment velocity (V_F) in ft/s, the maximum fragment weight (W_F) in pounds, and the kinetic energy ($W_F V_F^2/2$) in lb-ft^2/s^2 for the particular munition.

(2) Identify the munition with the next largest kinetic energy, from Table 6.

(3) Use the sandbag wall and roof thickness from Table 5 for the munition with the next largest kinetic energy shown in Table 6.

Table 6 provides the maximum fragment weight, the initial fragment velocity, and the resulting kinetic energy for the 5 munition types. The maximum fragment weight and the initial fragment velocity values were determined with the Mott and Gurney equations, as presented in TM 5-1300 [1] and detailed in HNC-ED-CS-S-98-1 [2].

Table 5 - Required Wall and Roof Thicknesses for Sandbag Enclosures, with Expected Sandbag Throw Distances and Pressures, for Five Tested Munitions

Munition	Charge Weight, Comp B, lb	Required Wall and Roof Sandbag Thickness, in	Expected Maximum Sandbag Throw Distance, ft	Expected Peak Pressure @ 40 feet, psi	Expected Peak Pressure @ 80 feet, psi	Expected Sound Level @ 100 feet, dB
155-mm M107	15.4	36	220	0.18	0.09	115
4.2-in M329A2	8.17 (TNT)	24	125	0.16	0.06	116
105-mm M1	5.08	24	135	0.18	0.08	120
81-mm M374A2	2.1	20	125	0.14	0.05	119
60-mm M49A3	0.43	12	25	0.05	0.03	118

Table 6 - Maximum Fragment Weight, Initial Fragment Velocity and Kinetic Energy for Five Tested Munitions

Munition	W_F, Maximum Fragment Weight, lb	V_F, Initial Fragment Velocity, ft/s	Kinetic Energy, 10^6 lb-ft^2/s^2
155-mm M107	0.467	4667	5.085
4.2-in M329A2	0.079	6391	1.613
105-mm M1	0.155	4870	1.868
81-mm M374A2	0.031	6721	0.700
60-mm M49A3	0.033	3605	0.214

As an example, for a shell such as the 3-in Stokes Mortar Round, the maximum fragment weight and initial fragment velocity are 0.0436 lb and 6189 ft/s, respectively. The resulting kinetic energy is 0.835 x 10^6 lb-ft^2/s^2. The next largest fragment kinetic energy in Table 6 is the 4.2-in M329A2 round. Therefore, a sandbag enclosure with a roof and wall thicknesses of 24 inches should be used to contain the fragments and suppress the blast overpressures. The maximum sandbag throw distance is 125 ft. Therefore, the withdrawal distance is 200 ft.

Based on this procedure, a more complete list of typical munitions is given in Table 7. This table includes the required sandbag wall and roof thicknesses and maximum expected sandbag throw distances to be used for each munition. For other munitions not listed in Table 7, the procedure given above can be used. The procedure should not be used to extrapolate sandbag thicknesses or sandbag throw distances for munitions larger than the 155-mm M107.

3.2 Enclosure Construction Method

The enclosure construction method follows the procedure that was used to build the test enclosures, with a few modifications. Figure 4 illustrates a typical enclosure. Figure 5 shows a photograph of a sandbag enclosure for an 81 mm mortar.

The sandbag fabric should be woven polypropylene. Each bag should have a nominal volume of 0.5 ft^3 and an approximate weight when full of 50 lb. The bags should be filled with washed sand, either dry or in saturated surface dry (that is, slightly moist) condition. Wet sand should not be used. Prefilled sandbags should be protected from the rain by storage on pallets, off the ground surface, and by covering them with a plastic tarpaulin or similar cover to prevent them from becoming saturated with water. The gradations and physical composition of the sand are not critical but it should be at least typical of local construction practice for sand used in foundations and backfill. Minor inclusions of clay or soils materials can be permitted. However, no rocks or stones should be placed in the sandbags. Typically, the sand used for the tests had a density of about 100 pounds per cubic foot and a moisture content of 6-7%.

Four walls of identical thickness should surround the munition. The minimum wall thickness should be the thickness determined using the procedure in Section 3.1 above. The sandbag walls should be stacked to maintain a clear standoff distance of 6 inches between the shell and the inside face of each wall. The interior face of each wall should be vertical but the exterior face can be built with a 1:6 slope (2" horizontal to 12" vertical). If a sloped outer face is used, the thickness of the wall, at the nominal "top" of the wall, 6 inches above the top of the munition, must be no less than the specified required thickness

The sandbags should be placed tightly against each other. All vertical joints should be staggered, so there is no clear line of sight from the munition to the exterior. As the wall is built, each new layer of sandbags should run in opposite direction to the layer below, so that the layers are interlocked (see Figure 6).

At a minimum, a double layer of sandbags shall be used. For example, when a 12" thickness is required, the sandbags should be oriented so that two sandbags are necessary to achieve this thickness (see Figure 7).

After the walls are constructed to a height of 6" above the upper surface of the munition, the shaped charge or other initiator should be placed on the shell. Ideally, the use of shaped charges, such as oil well perforators, is recommended. These add very little to the total charge weight for each detonation, given the highly directional nature of the effects of the shaped charge. Also, the use of shaped charges for initiation parallels test procedures. The shaped charge should be located either on top of the munition or on its side. If it is located on the side of the round, the charge should be tilted downward sufficiently to ensure that the shaped charge jet penetrates the round and is directed into the ground, rather than into the opposite sandbag wall. Generally, a small mound of sand next to the round can be used to establish this orientation.

A sheet of 3/4-inch thick Douglas Fir (or equivalent) plywood should be cut to the dimensions of the cavity between the walls, plus 12 inches in each direction. The plywood sheet is then centered on the walls so that it bears on 6" of each wall. The additional sandbags that make up the roof of the enclosure are then placed on top. As with the side walls, the roof sandbags should be stacked with staggered horizontal joints and alternating directions in each layer. The exterior sides of the roof may also be vertical or have a 1:6 slope. The thickness of the sandbag roof, above the plywood panel, must be the same as the required wall thickness.

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

Table 7 - Required Wall and Roof Thicknesses for Sandbag Enclosures, with Expected Sandbag Throw Distances and Pressures, for Tested and Non-Tested Munitions

Munition	Charge Weight (lb)	W_F, Maximum Fragment Weight, lb	V_F, Initial Fragment Velocity, ft/s	Kinetic Energy, 10^6 lb-ft^2/s^2	Required Wall and Roof Sandbag Thickness, in	Expected Maximum Sandbag Throw Distance, ft	With-drawal Distance, ft
155mm M107*	15.48	0.467	4667	5.086	36	220	220
4.7-in Mark I	6.07	0.591	3566	3.761	36	220	220
105mm M1*	5.08	0.155	4870	1.840	24	135	200
4.2-in M329A2*	8.165	0.079	6391	1.607	24	125	200
4-in Stokes	7.92	0.078	6336	1.570	24	125	200
75mm M48	1.47	0.153	3471	0.922	24	125	200
3-in Stokes	2.1	0.044	6189	0.835	24	125	200
2.75-in M229 Rocket	4.8	0.050	5569	0.777	24	125	200
81mm M374*	2.1	0.031	6721	0.696	20	125	200
37mm MK II	0.53	0.030	5758	0.490	20	125	200
60mm M49A3*	0.42	0.024	5114	0.310	12	25	200
FMU 54A/B	0.357	0.006	9031	0.263	12	25	200
40mm MK2 Mod 0	0.187	0.033	3605	0.215	12	25	200
MK II Grenade	0.125	0.014	3425	0.083	12	25	200
25mm M792	0.096	0.005	5736	0.081	12	25	200
M67 Grenade	0.40625	0.001	7006	0.029	12	25	200
20mm M56A4	0.0264	0.0000011	4941	0.004	12	25	200

* = tested munitions

3.3 Withdrawal Zone

A withdrawal zone is necessary for any detonation. This withdrawal zone applies to everyone, both public and operational personnel. The withdrawal zone is the maximum of the sandbag throw distance, the distance to a sound level of 140 db, or 200 ft. For all munitions tested, the sound level at 100 ft was substantially less than 140 db. At 200 ft. the sound level will be even lower. The withdrawal zones are also listed in Table 7.

4.0 Summary and Conclusions

A test program has been performed to determine the effects of sandbag enclosures for mitigating fragments and blast effects due to an intentional detonation of a munition. A total of eighteen tests on five different munitions were performed. A summary of the test procedures and results are presented in this document.

The results of these tests have been used to develop guidelines for the use of sandbag enclosures to mitigate the fragments and blast effects due to an intentional detonation of a munition. Methods for determining the required sandbag thickness and the resulting sandbag throw distance are detailed in Section 3.0. Figures 4, 5, 6 and 7 show the resulting sandbag enclosures.

5.0 References

1. TM5-1300, "Structures to Resist the Effects of Accidental Explosions", Departments of the Army, the Navy, and the Air Force, November 1990.

2. HNC-ED-CS-S-98-1, "Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives", M. Crull, U.S. Army Engineering and Support Center, Huntsville, January 1998.

3. "Evaluation of Sandbags for Fragment and Blast Mitigation", D. Stevens, Southwest Research Institute, San Antonio, TX, January 1998.

4. "User's Guide for Microcomputer Programs CONWEP and FUNPRO Applications of TM 5-855-1. "Fundamentals of Protective Design For Conventional Weapons"", Revision 2, D. Hyde, US Army Corps of Engineers Waterways Experiment Station, February 1989.

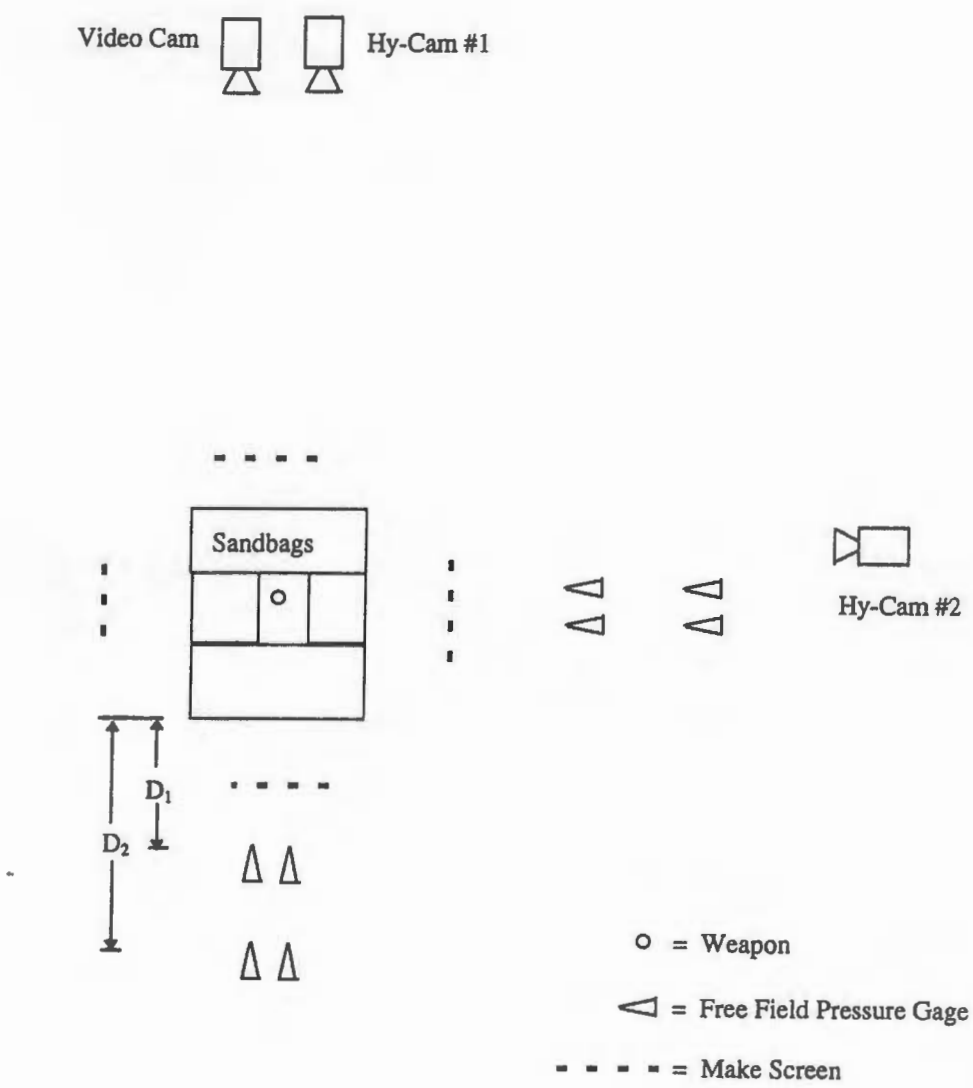
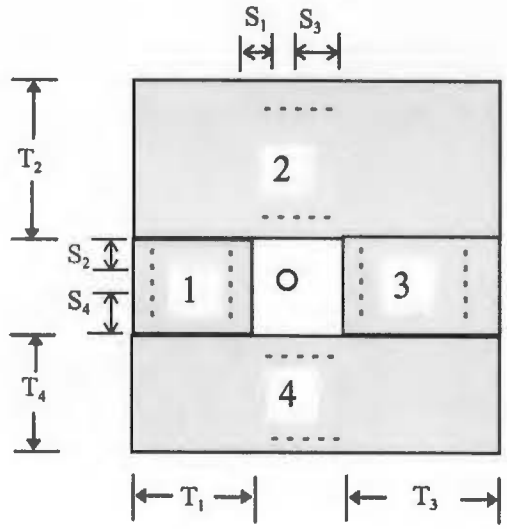
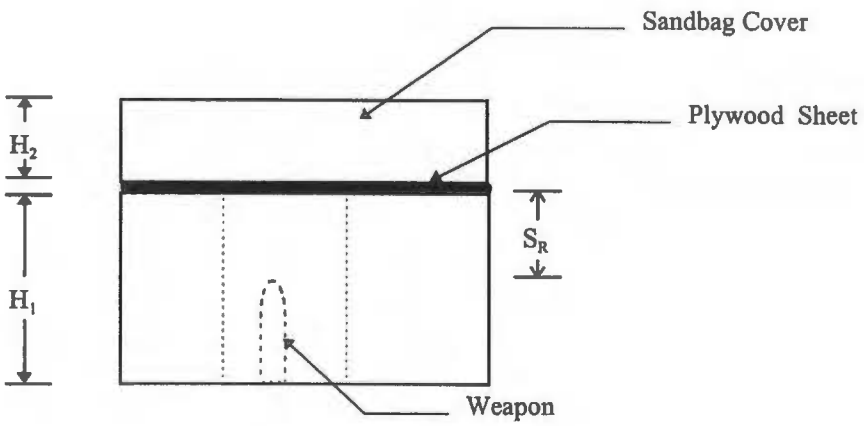


Figure 1 – Site Layout for Tests of Sandbag Enclosures

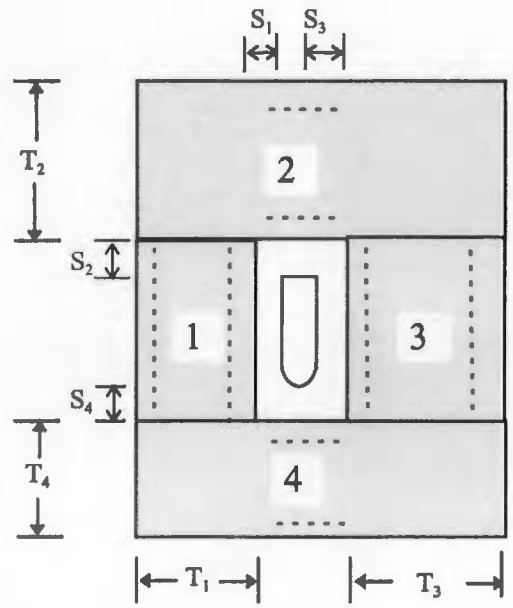


PLAN



ELEVATION

Figure 2 – Sandbag Enclosure Configuration for Vertical Weapon Tests



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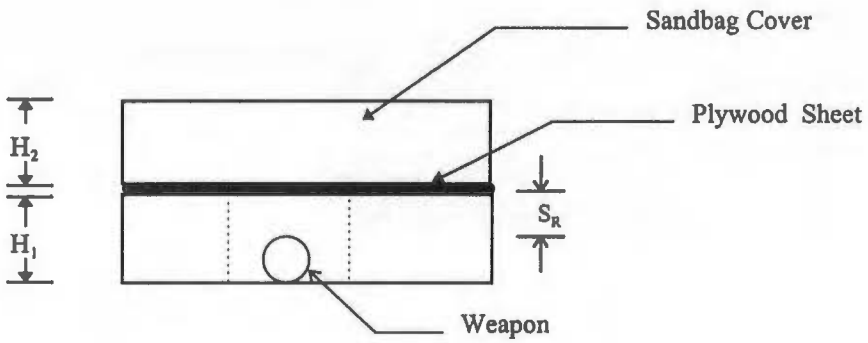
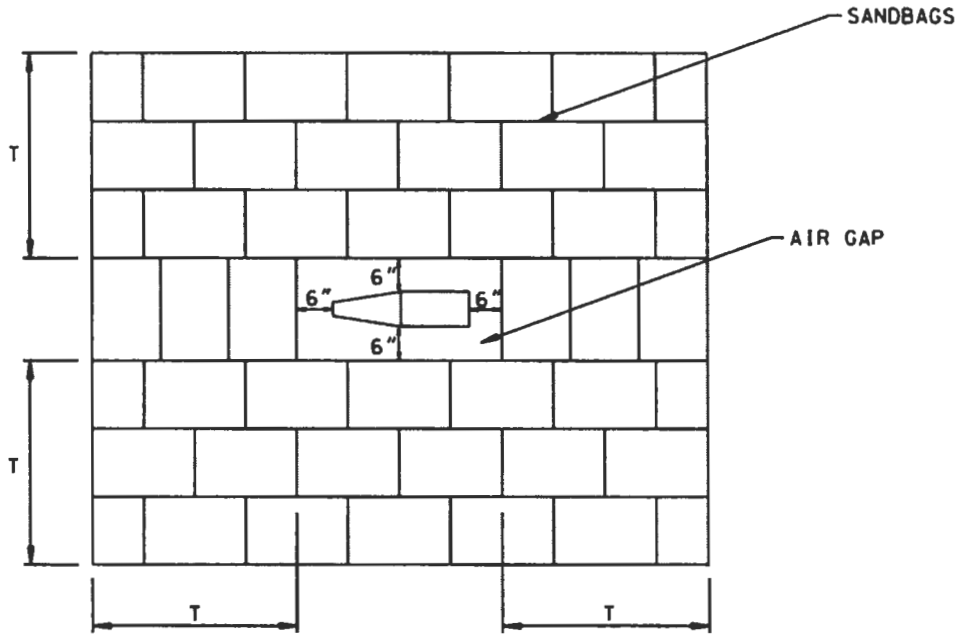


ELEVATION

Figure 3 – Sandbag Enclosure Configuration for Horizontal Weapon Tests



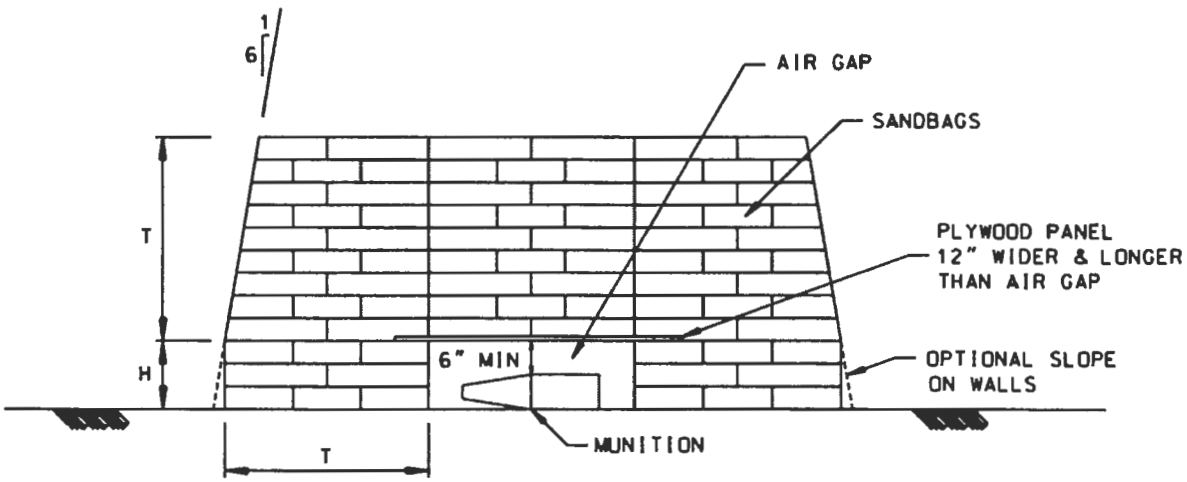
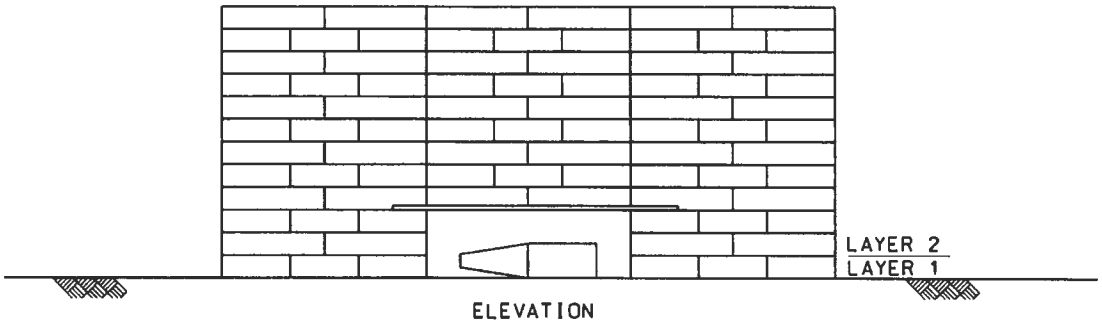
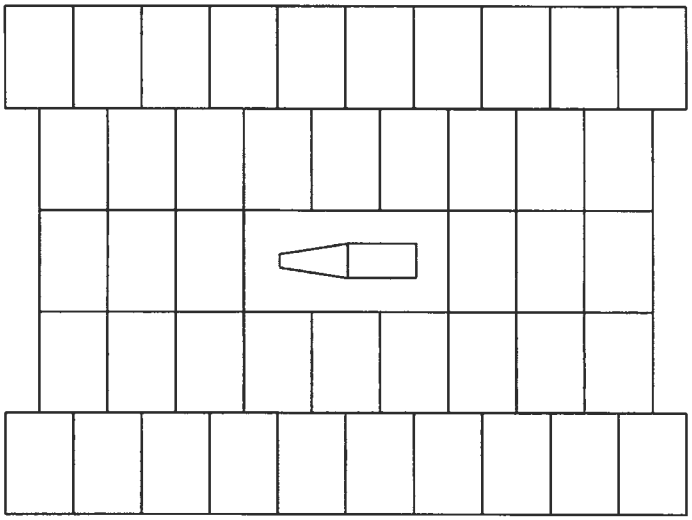


Figure 4 - Typical Sandbag Enclosure

Figure 5 – Sandbag Enclosure for an 81 mm M374A2 mortar.





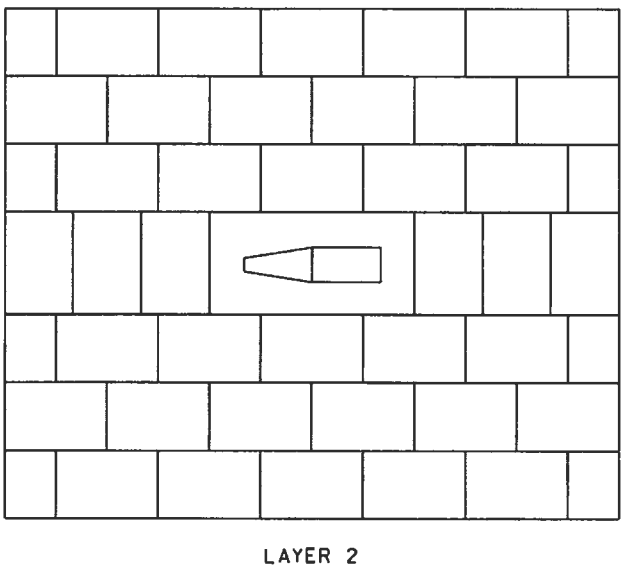


Figure 6 - Interlocking Alternate Layers of Sandbags

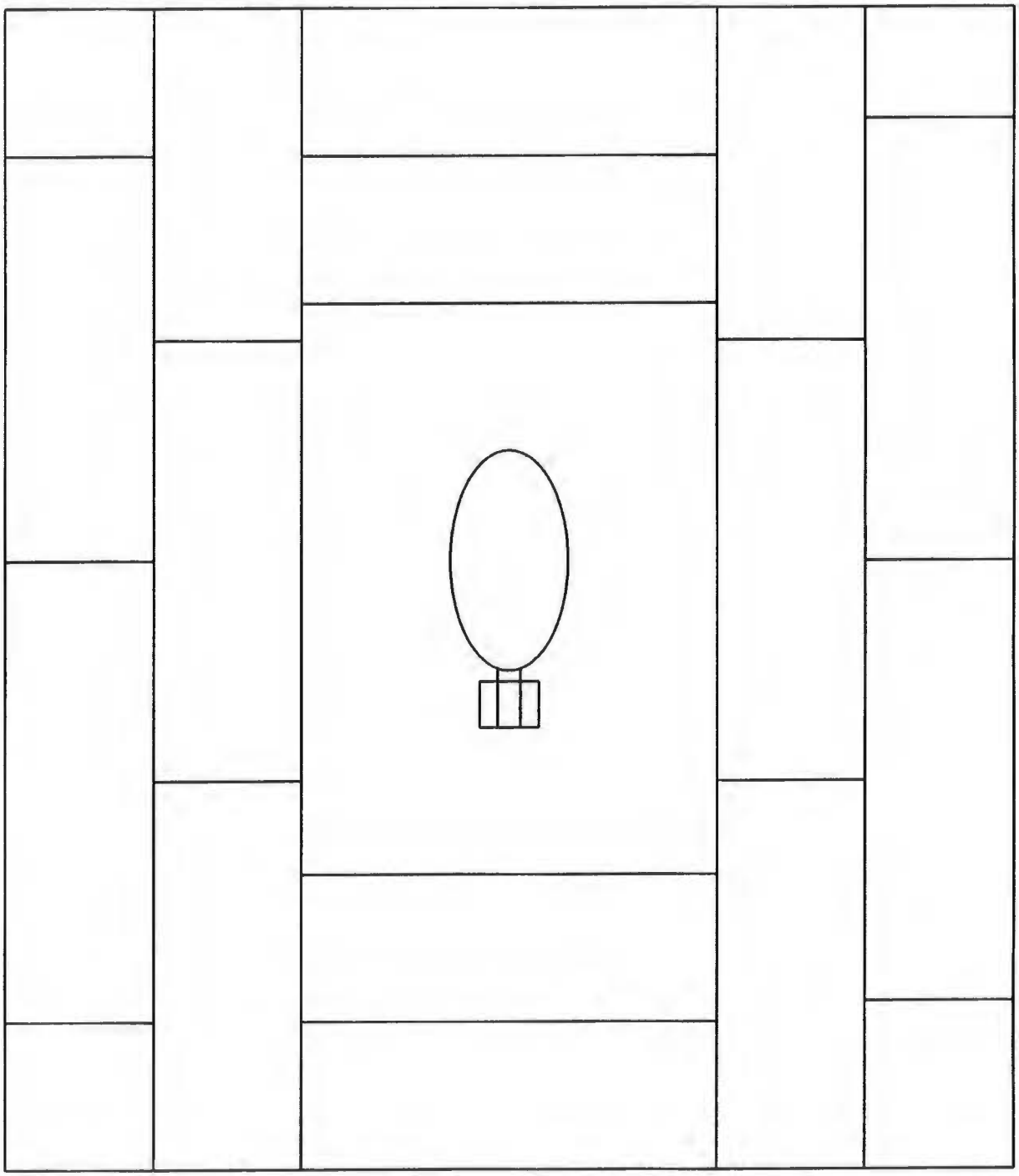


Figure 7 - Configuration for 12" Wall Enclosures

ATTACHMENT 3

MITIGATION OF BLAST AND FRAGMENTATION USING WATER

US Army Corps of Engineers
Engineering and Support Center, Huntsville

USE OF WATER FOR MITIGATION OF FRAGMENTATION AND BLAST EFFECTS DUE TO INTENTIONAL DETONATION OF MUNITIONS

HNC-ED-CS-S-00-3
SEPTEMBER 2000

DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
2461 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22331-0600

27 FEB 2001

DDESB-KT

MEMORANDUM FOR US ARMY DEFENSE AMMUNITION CENTER
(ATTENTION: SMAAC-ESL)

SUBJECT: Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonations of Munitions, Report HNC-ED-S-00-3 (December 2000)

Reference: SMAAC-ESL (CESO-E/19 Dec 00) (385[A]) 1st End dated 21 December 2000, Subject: Explosives Safety Submission (ESS) for Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonations of Munitions, HNC-ED-S-00-3, September 2000

The Department of Defense Explosives Safety Board (DDESB) Secretariat has reviewed the mitigation technology described in the subject report as requested by the reference. Based on the information furnished in the report the water mitigation techniques for intentional detonations defined in Section 3.0 of the report are approved for field use in Ordnance Explosives (OE) removal action projects.

A copy of this memorandum of approval must be included with a DDESB approved site plan, and be available at OE sites where intentional detonations are conducted that use the approved water mitigation technique.

The DDESB point of contact for this action is Dr. Jerry M. Ward, Director, Technical Programs Division, DSN: 221-2525, Commercial phone: (703) 325-2525; Fax: (DSN) 221-6227 and E-mail: Jerry.Ward@hqda.army.mil.

DANIEL T. TOMPKINS
Colonel, USAF
Chairman

USE OF WATER FOR MITIGATION OF FRAGMENTATION AND BLAST EFFECTS DUE TO INTENTIONAL DETONATION OF MUNITIONS

HNC-ED-CS-S-00-2

FEBRUARY 2000

Prepared By
Michelle Crull, PhD, PE

Department of the Army
U.S. Army Engineering and Support Center, Huntsville
Attn: CEHNC-ED-CS-S
P.O. Box 1600
Huntsville, AL 35807-4301

Telephone: Commercial (256) 895-1650

Reviewed by: _____

WILLIAM H. ZEHRT, PE DATE
Chief, Structural Branch

Approved by: _____

PAUL M. LAHOUD DATE
Chief, Civil-Structures Division

EXECUTIVE SUMMARY

The U.S. Army Engineering and Support Center, Huntsville (USAESCH) is currently engaged in projects which require the disposal of uncovered/discarded ordnance and explosives (OE) on public and private lands. The uncovered OE item is often detonated in place if it is too dangerous to move. In some cases, covering and tamping with loose earth is used to contain the blast and fragments. Another method to mitigate the fragmentation and blast effects is to cover the item with sandbags. However, both of these methods result in secondary fragments (earth clumps or sandbags) being thrown some distance from the blast. Preliminary tests show that water can be used to mitigate the fragmentation and blast effects and, depending on the method used to contain the water, there may be no hazardous secondary fragments. In addition, the water quenches the fireball and there is no fire hazard associated with the detonation. This last observation is especially important when working in a high fire hazard area.

The Structural Branch, USAESCH, sponsored a test program in 1999 to evaluate the use of water for fragment and blast mitigation, for intentional detonations at Ordnance and Explosives (OE) sites. The U.S. Army Engineer Research and Development Center (USAERDC), with USAESCH performed a two-phase test program of water mitigation of blast and fragmentation. In phase one, tests were conducted using four different munitions to determine the depth of water required to defeat the fragments. In phase two, different water containment systems were tested for these munitions.

For phase one, the munitions were suspended vertically in an aboveground pool in an off-center position. Thus the fragments were dispersed through varying thicknesses of water. Witness panels of 0.032" aluminum were used to record any fragments that might exit the pool. Witness screens were placed in the pool at various distances from the munition to determine if the fragments had penetrated that far.

Once a required water thickness was determined for each of the four munitions in phase one, containers were selected to test for use in actual disposal situations. The points considered in this selection were adaptability to munition size, transportability (empty or pre-filled with water), debris producing potential, adaptability to uneven terrain, and cost. The water containment systems tested were 55-gallon plastic drums, 1100-gallon plastic agricultural chemical tanks, 5-gallon stackable plastic carboys, and inflatable plastic wading pools.

These tests showed that water is a feasible means of mitigating fragments and blast effects from an intentional detonation. The containers that are made of heavy plastic produce secondary fragments that may be thrown some distance from the blast. The inflatable swimming pools did not produce any significant secondary fragments. Some small pieces of these pools were found around the site but, since the pool was made of thin flexible plastic, these pieces were very

lightweight and not hazardous. High-speed photography of the tests shows that there is no fireball. Therefore, there is no fire hazard associated with the detonation.

The results of these tests have been used to develop guidelines for the use of water to mitigate fragments and blast effects due to an intentional detonation of a munition. Methods for determining the required water containment system and the resulting minimum separation distance are detailed in this report. Figures are provided to show the resulting munition/initiator configuration and water containment systems.

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1.0 INTRODUCTION

The U.S. Army Engineering and Support Center, Huntsville (USAESCH) is currently engaged in projects which require the disposal of uncovered/discarded ordnance and explosives (OE) on public and private lands. The uncovered OE item is often detonated in place if it is too dangerous to move. In some cases, covering and tamping with loose earth is used to contain the blast and fragments. Another method to mitigate the fragmentation and blast effects is to cover the item with sandbags. However, both of these methods result in secondary fragments (earth clumps or sandbags) being thrown some distance from the blast. Preliminary tests show that water can be used to mitigate the fragmentation and blast effects and, depending on the method used to contain the water, there may be no hazardous secondary fragments. In addition, the water quenches the fireball and there is no fire hazard associated with the detonation. This last observation is especially important when working in a high fire hazard area.

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site but, since the pool was made of thin flexible plastic, these pieces were very lightweight and not hazardous. High-speed photography of the tests shows that there is no fireball. Therefore, there is no fire hazard associated with the detonation.

2.0 TEST PROGRAM

The munitions used in both phases of the tests are the 60 mm M49A4 mortar, the 81 mm M362A1 mortar, the 105 mm M1 projectile and the 155 mm M107 projectile.

2.1 Phase One Tests

Commercially available aboveground swimming pools were used to contain the water in the phase one tests because they were easily obtainable and relatively inexpensive. Different size pools were used for different munitions. In the phase one tests the munitions were suspended vertically in the pool at a specified distance from the edge of the munition to one edge of the pool (off-center). Window screens were suspended from 2"x2" wood beams 180 degrees from the nearest edge of the pool at specified distances from the munition. These were used as witness panels in the pool. Witness panels of 0.032" aluminum were placed around the outside of the pool to record any fragments that might leave the pool. The test layout is shown in Figure 1 and the dimensions of the pool and placement of the munition and witness screens are shown in Table 1. The detonations were initiated using C-4 packed in the fuze well.

TABLE 1 – Phase One Test Parameters

Munition	Pool Diameter	Distance, R1 Edge of Pool	Expected Penetration	Pool Depth	Munition Distance from		Munition to Screen Distance			
					Bottom	Surface	S1	S2	S3	S4
60mm	90"	6"	8"	18"	2"		5"	10"	15"	20"
81mm	90"	12"	18"	24"	2"		10"	15"	20"	25"
105mm	12'	24"	30"	24"	3.5"	3"	30"	30"	40"	50"
155mm	18'	36"	48"	46"	4"	15"	40"	50"	60"	70"

2.1.1 155 mm M107 Projectile

The 155 mm M107 projectile contains 15.4 lbs of Comp B. For the phase one test, the booster was removed and the fuze well was packed with C-4. An 18 ft diameter, 4 ft deep pool was used for this test. The projectile was placed base down to make sure the base plate did not become airborn. Fragments were found all around the pool. One section of the metal pool wall from the near blast region was wrapped in a witness panel and thrown over 200 feet from ground zero.

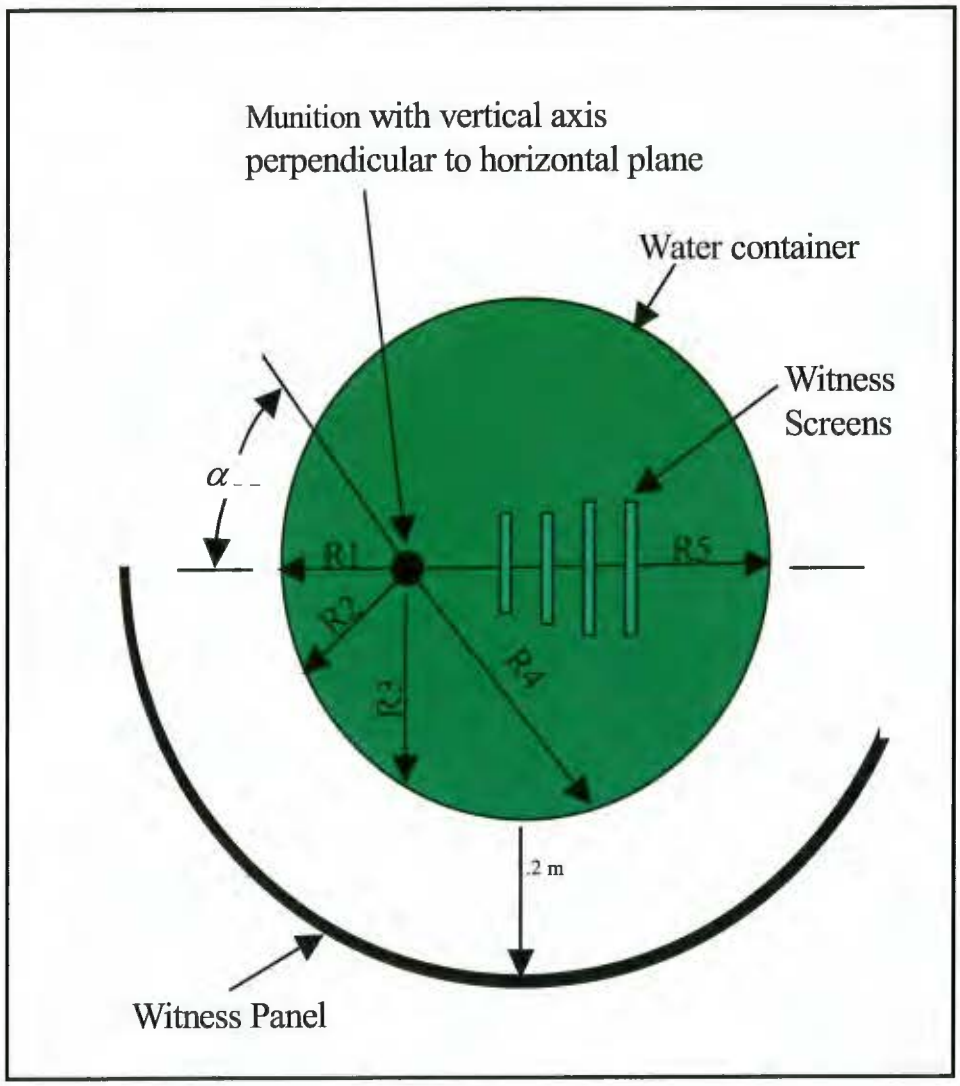


FIGURE 1 – Test Layout for Phase One Tests

TABLE 2 – 155 mm M107 Phase One Results

Perforation of Pool			Fragment Size		Comments	Witness Screens	
Angle A, degrees	Distance D, in.	Height, in.	Length, in.	Width, in		Screen No.	Distance, in.
40.54	70.31		2	1.5		1	24
59.93	96.46		4	2		2	30
66.45	104.96		1	0.125		3	40
						4	50
						5	60
						6	70

Note: Fragment penetrated 5th screen but not 6th.

2.1.2 105 mm M1 Projectile

The 105 mm M1 projectile contains 5.07 lbs of Comp B. For the phase one test the fuze well was packed with C-4. A 12 ft diameter, 2 ft deep pool was used for this test. The projectile was placed base down to make sure the base plate did not become airborn. Fragments were recovered out to a distance of approximately 75 feet from the pool. There were no penetrations in the side or rear of the pool or witness panels, so the explosive mass apparently lofted these fragments along with the water.

TABLE 3 – 105 mm M1 Phase One Results

Perforation of Pool			Fragment Size		Comments	Witness Screens	
Angle A, degrees	Distance D, in.	Height, in.	Length, in.	Width, in		Screen No.	Distance, in.
25.97	38.87	28	5	1		1	30
47.96	53.83	12	6	1	Tear?	2	42
						3	54
						4	66
						5	80

Note: Fragment penetrated 1st screen only.

2.1.3 81 mm M362A Mortar

The 81 mm M362A mortar contains 2.1 lbs of Comp B. For the phase one test the fuze well was packed with 113 grams of C-4. A 90 inch diameter, 24 inch deep pool was used for this test. The mortar was placed nose down in the pool with the nose 2 inches off the bottom. No fragments penetrated the rear side of the pool. The tail fin was recovered 42 feet from the pool. One fragment was recovered 130 feet from the pool.

TABLE 4 – 81 mm M362A Phase One Results

Perforation of Pool			Fragment Size		Comments	Witness Screens	
Angle A, degrees	Distance D, in.	Height, in.	Length, in.	Width, in		Screen No.	Distance, in.
2.56	12.12	17	2.5	0.25		1	10
2.56	12.12	17	1.5	0.125	Dent	2	15
1.79	12.06	36	0.25	2		3	20
7.62	13.05	7	4	2		4	25
7.34	12.97	5	1	0.25	Dent		
7.62	13.05	9	0.75	0.5			
8.46	13.28	12	1	0.5	3 together		
9.61	13.63	14	0.25	0.25	Frag imbedded		
7.62	13.05	22	0.5	0.25			
7.34	12.97	33	2	1			
7.89	13.12	36	1	0.5			
10.50	13.92	9	3	1			
10.80	14.02	37	0.75	0.75			

Note: Fragment penetrated 3rd screen but not 4th.

2.1.4 60 mm M49A4 Mortar

The 60 mm M49A4 mortar contains 0.42 lbs of Comp B. For the phase one test the fuze well was packed with 65.2 grams of C-4. A 90 inch diameter, 18 inch deep pool was used for this test. The mortar was placed nose down in the pool with the nose 2 inches off the bottom. The pool was filled to the top (22 inch depth) but no effort was made to level the ground under the pool. As a result the low side of the pool began to sag before the test. Sandbags were used to prop up this side. No fragments penetrated the rear of the pool, but were found in the bottom of the pool. Fragment holes were found in the lower portion of the witness panel. Several fragments were found 30 to 40 feet from the pool, but the fragment field extended only 30 degrees off a line running through the center of the munition to the nearest point on the side of the pool. No fragments were found in the same region behind the witness panel side, although several fragments penetrated the witness panel.

TABLE 5 – 60 mm M49A4 Phase One Results

Perforation of Pool			Fragment Size		Comments	Witness Screens	
Angle A, degrees	Distance D, in.	Height, in.	Length, in.	Width, in		Screen No.	Distance, in.
2.97	7.32	10	1.75	1.25		1	5
6.07	8.26	4	2.25	0.25		2	10
6.07	8.26	12	0.5	0.125		3	15
6.67	8.49	4	1	0.125	dent	4	20

Note: Fragment penetrated 1st screen but not 2nd.

2.1.5 Phase One Summary and Conclusions

Open front barricade tests using the 60 mm and 81 mm mortars and the 105 mm projectile were also conducted at this test range during this time. The

detonations were all initiated by packing the fuze wells with C-4. It was observed that the fragments from the water tests were significantly larger than those from the barricade tests. This is most likely due to the confinement of the water. Compared to the number of fragment impacts observed in the barricade tests, a very small number of fragments penetrated the witness panels in the water tests. The water contained all but the most energetic fragments. A summary of the penetration distances is presented in Table 6. The screen distance is the distance of the first screen that was not penetrated by fragments. The panel distance is the longest travel distance through water of a fragment impacting the witness panel.

Because these fragments were larger than would be expected from the detonation of a munition not submerged in water, they probably penetrated a greater thickness of water than would be expected in an intentional detonation of a munition in the field. Consequently, in actual field conditions, the thickness of water required to contain munition fragments can be expected to be less than those shown here.

TABLE 6 – Water Penetration Distance, Phase One

Munition	Fragment Penetration, in.	
	Screen	Panel
60 mm M49A4	< 10	8.5
81 mm M362A	< 25	14
105 mm M1	< 42	53
155 mm M107	< 70	105

2.2 Phase Two Tests

Phase Two tests were set up in a manner simulating actual field conditions. For each test the munition was placed in a horizontal orientation in a hole with the top of the munition six inches below the ground surface. A piece of plywood was placed over the hole to keep the water containers from resting on the munition. The detonation was initiated using a GOEX oil well perforator charge containing 26 grams of RDX. The perforator was placed on the side of the munition so that the shaped charge was directed slightly downward. Pressure gages and sound meters were used to measure the blast effects. Video cameras and a high speed digital camera were used to record each test. The test setup is shown in Figure 2.

2.2.1 155 mm M107 Projectile

Two water containment systems were tested with the 155 mm M107 projectile. The first system was two layers of 55 gallon drums and the second system was a single 1100 gallon agricultural tank.

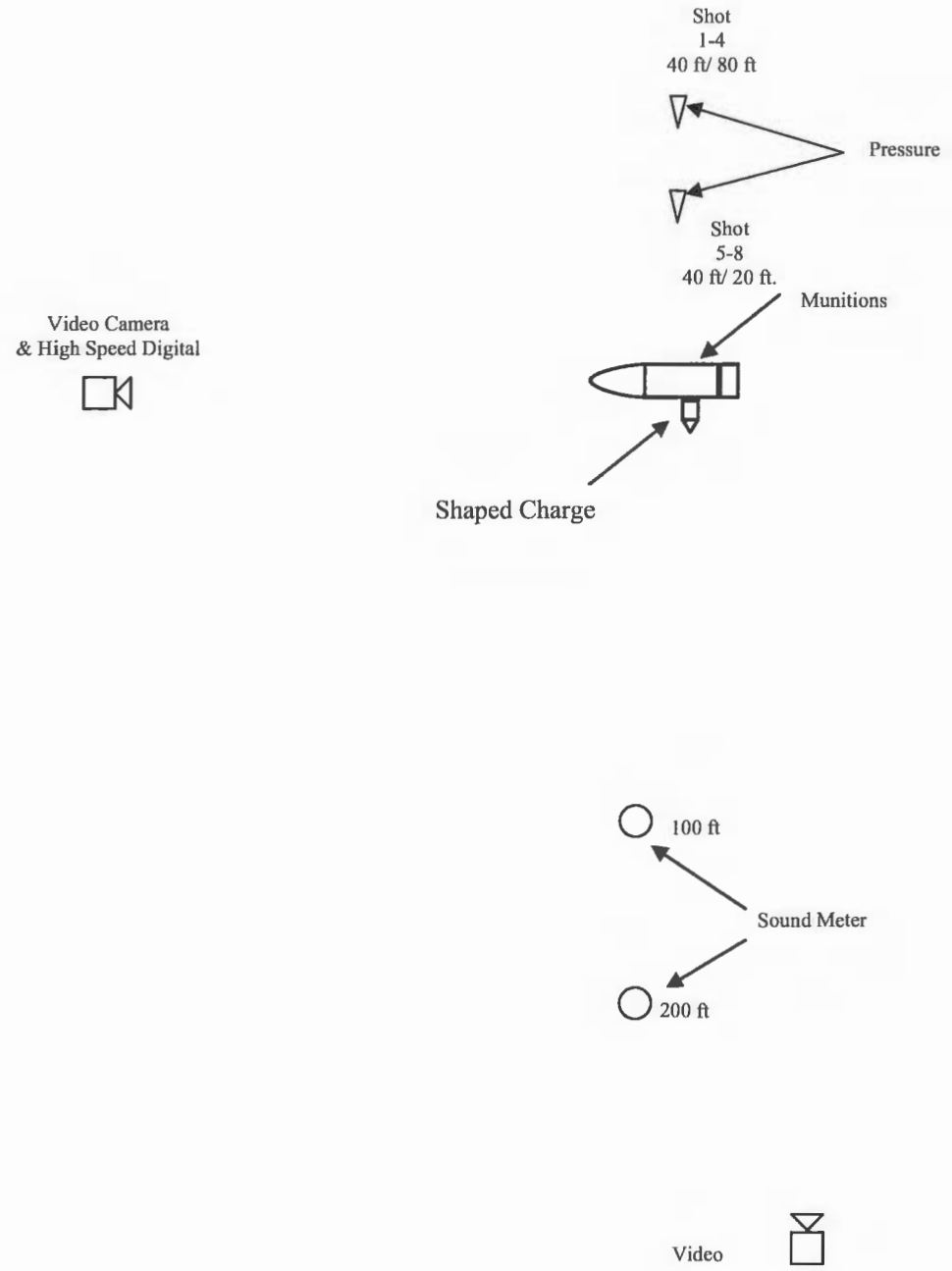


FIGURE 2 – Instrument and Camera Layout for Phase Two Tests

2.2.1.1 Water Contained in 55 Gallon Drums

After placing the 155 mm M107 with the initiator in the hole (see Figure 3), a sheet of ¾ inch plywood was placed over the hole and two layers of 55 gallon drums were placed over the projectile. A total of 28 drums were used with a witness panel placed between the layers and around the outside of the drums. This layout is shown in Figure 4.

The barrels were thrown seventy feet into the air. One barrel, mostly intact, was recovered about 300 feet from ground zero. It had apparently rolled part of this distance. The rest of the barrels were recovered within 100 feet of the crater.

A partially destroyed barrel was recovered approximately 55 feet from the crater with a 3 inch long fragment embedded in the inside surface. Beside this barrel was another fragment about 2 inches long, which may have fallen out of the barrel as it rolled. A small fragment was found inside one of the barrels from the top layer. Several fragments were found between 30 and 40 feet from the crater.

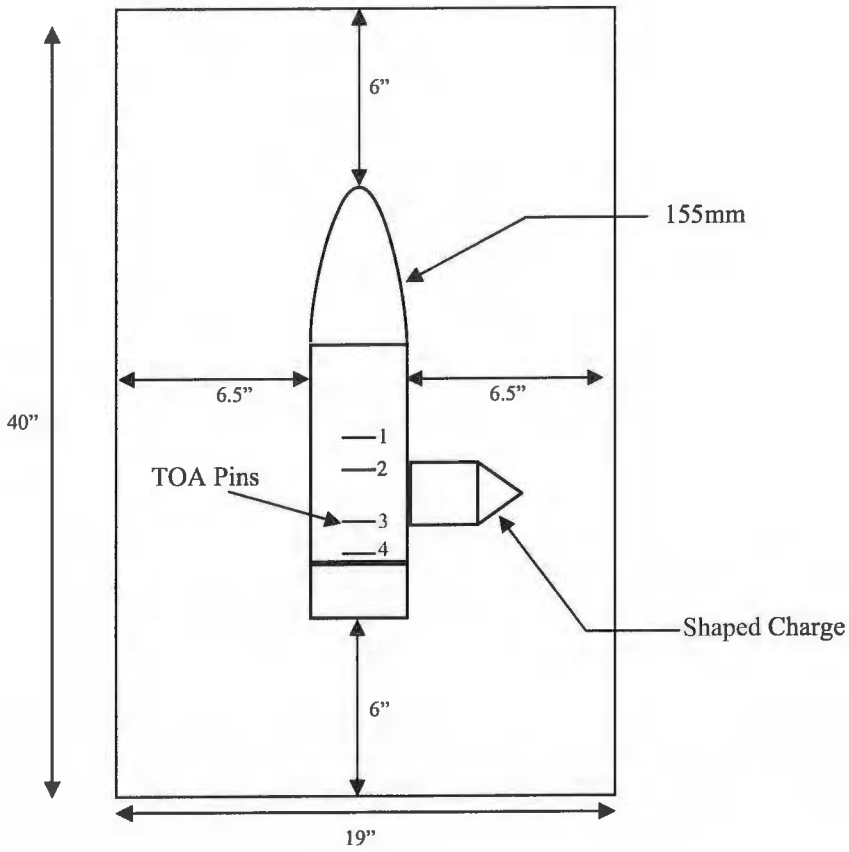
A small fragment hole (about ¼ inch in diameter) was found in the witness plate that was between the layers of barrels. The penetration appeared in the gap between barrels indicating that at least part the fragments path was through air and not water. The top barrel directly over the charge was perforated on the bottom and a circular section over the charge was dented by fragments but not perforated at the top.

Airblast and sound pressure measurements (converted from decibels to psi) are plotted against open-air blast pressure curves for a 155 mm M107 projectile in Figure 5.

Fragments from the 155 mm M107 projectile can penetrate more water than the 3 ft height of the barrels. Because there are significant gaps between the barrels when they are stacked (even more so on uneven ground), a greater area must be covered with barrels to insure that fragments do not escape. This method is very time consuming. Several hours were required to stack and fill all the barrels with water.

2.2.1.2 Water Contained in 1100 Gallon Agricultural Tank

An 1100 gallon agricultural tank was placed over the munition and filled with water. The cylindrical tank was 7 feet in diameter and 58 inches tall. The opaque plastic was approximately 1/8 inch thick. The test layout is shown in Figure 6. The detonation tore the tank into large pieces. One piece was recovered approximately 250 feet from ground zero. One fragment was embedded in the inner side of a piece of the tank but no fragments penetrated the tank.



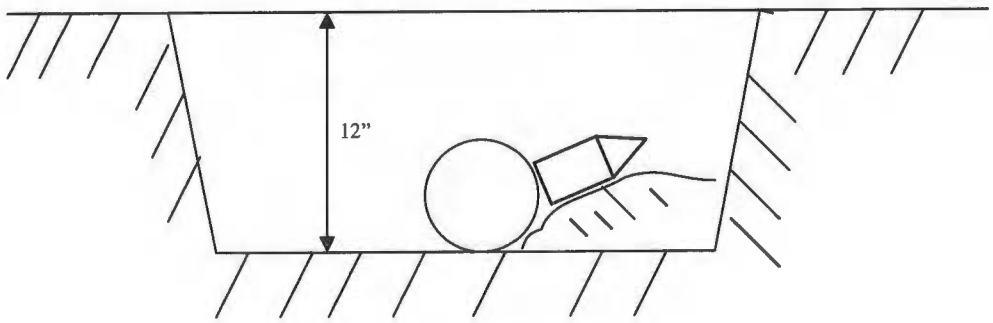


FIGURE 3 – Munition and Initiator Placement for 155 mm M107 Projectiles

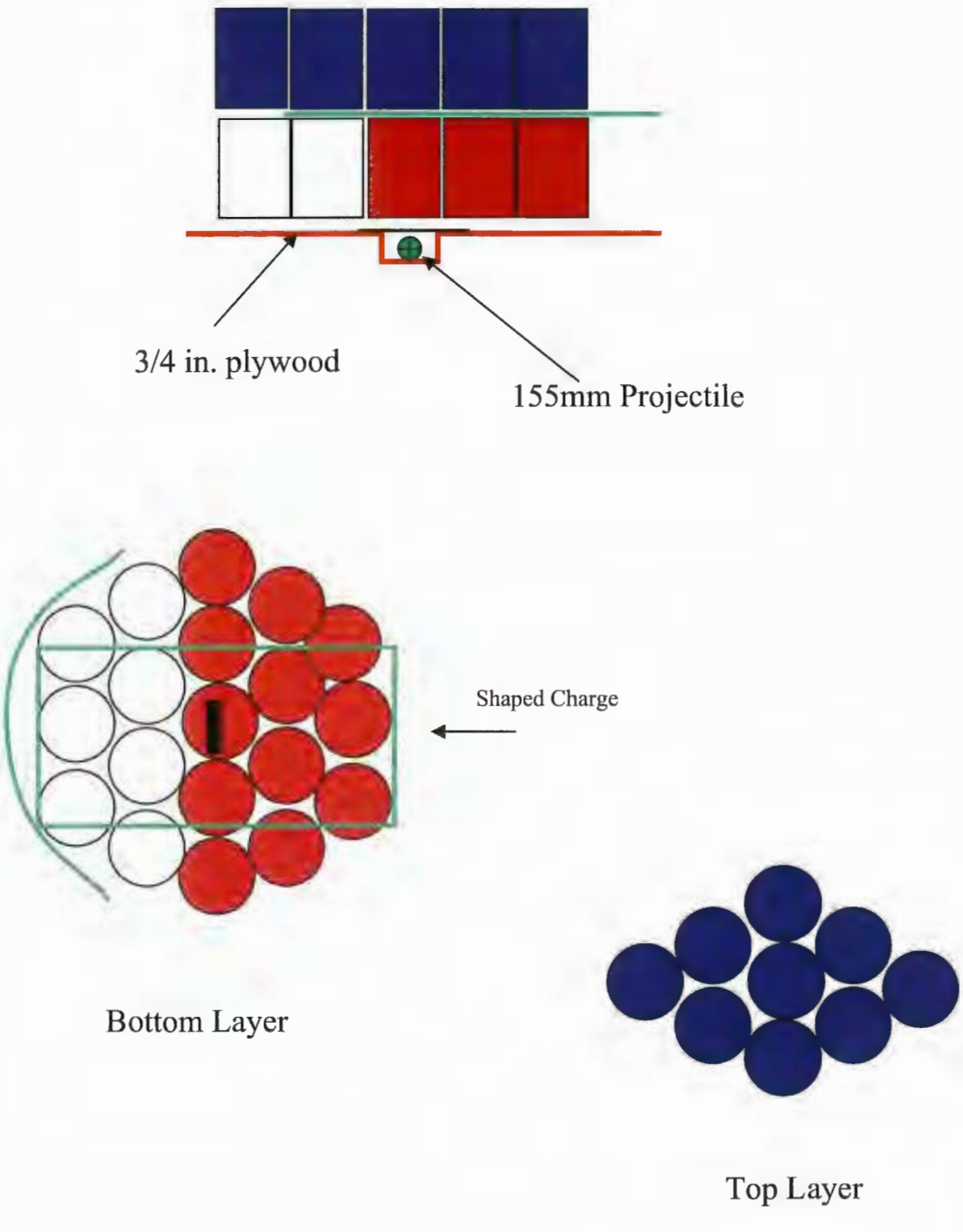


FIGURE 4 – Test Layout for 155 mm M107 Under 55 Gallon Drums

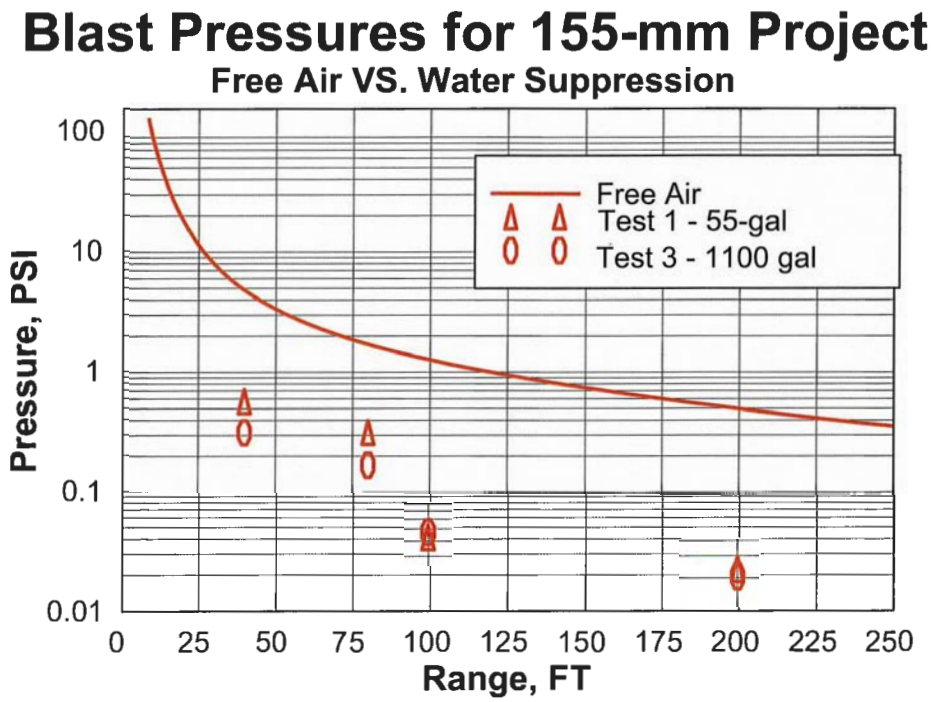


FIGURE 5 – 155 mm M107 Blast Pressures

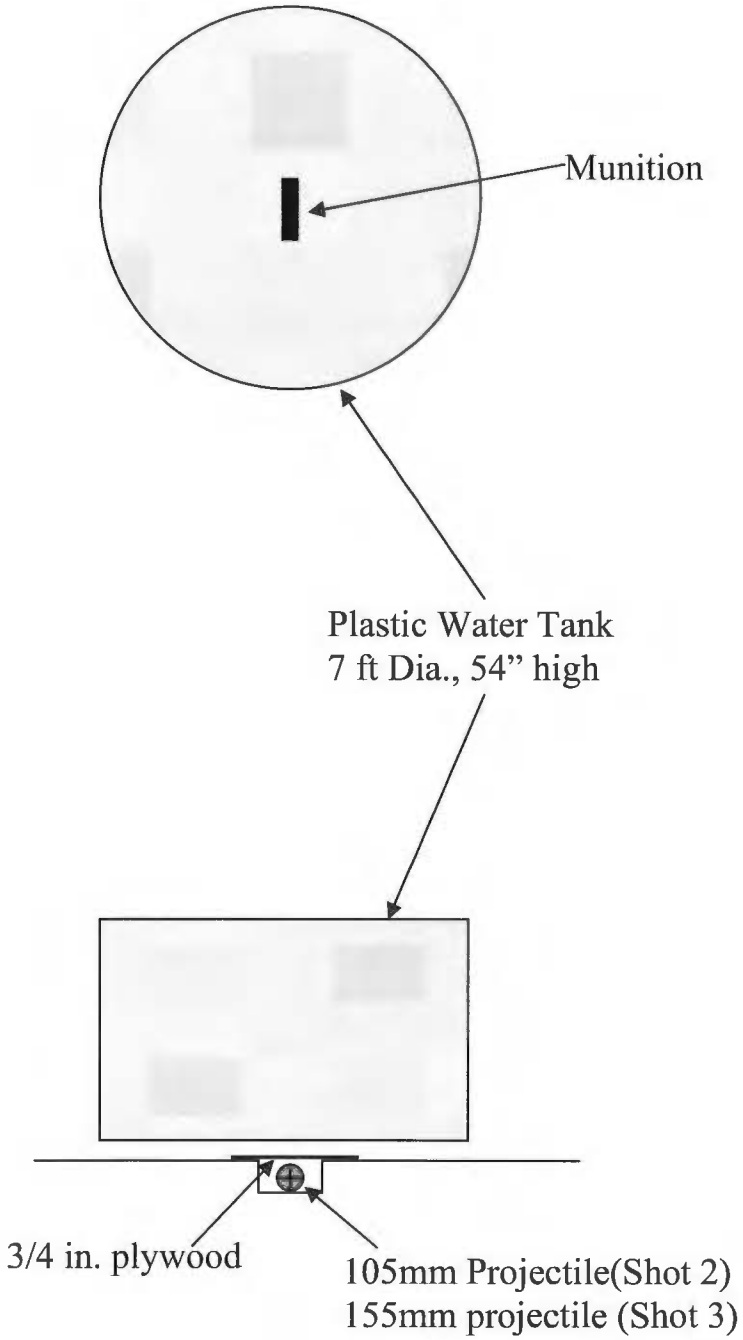


FIGURE 6 – Layout for Tests Using 1100 Gallon Agricultural Tank

2.2.2 105 mm M1 Projectile

Two water containment systems were tested with the 105 mm M1 projectile. The first system was two layers of 55 gallon drums and the second system was a single 1100 gallon agricultural tank.

2.2.2.1 Water Contained in 55 Gallon Drums

After placing the 105 mm M1 with the initiator in the hole (see Figure 7), a sheet of ¾ inch plywood was placed over the hole and two layers of 55 gallon drums were placed over the projectile. A total of 22 drums were used with a witness panel placed between the layers and around the outside of the drums. This layout is shown in Figure 8.

Several fragments penetrated the witness panel between the layers of drums and there were a few dents where the panel was impacted but the fragments did not penetrate. As in the 155 mm M107 test, the fragments penetrating the witness panel were in the gaps between barrels.

The furthest drum was recovered 70 feet from ground zero. Most of the top layer of drums seemed to come straight back down and land in or near the crater. Two of the drums in the crater were undamaged and full of water.

Airblast and sound pressure measurements (converted from decibels to psi) are plotted against open-air blast pressure curves for a 105 mm M1 projectile in Figure 9.

2.2.1.2 Water Contained in 1100 Gallon Agricultural Tank

The test layout is shown in Figure 6. Most debris was within 35 feet of the crater. A number of fragments were found within 50 feet of ground zero, including a piece of the base plate at 50 feet off the base end of the munition. A large piece of the tank was found at 180 feet. A 6 inch long fragment was stuck in the plastic with the bulk of the fragment on the inside of the tank. There were several dents in the witness panels, but only one complete penetration and the fragment causing this penetration was found within a few feet of the panel. Only one obvious exit hole was found in the side of the tank.

The tank is light, easy to place and, because of a large filler hole, can be filled with water in just a few minutes. This container defeated essentially all of the fragments. The one or two that did penetrate the container had been slowed enough that they did not travel any distance. The container pieces traveled further than these primary fragments.

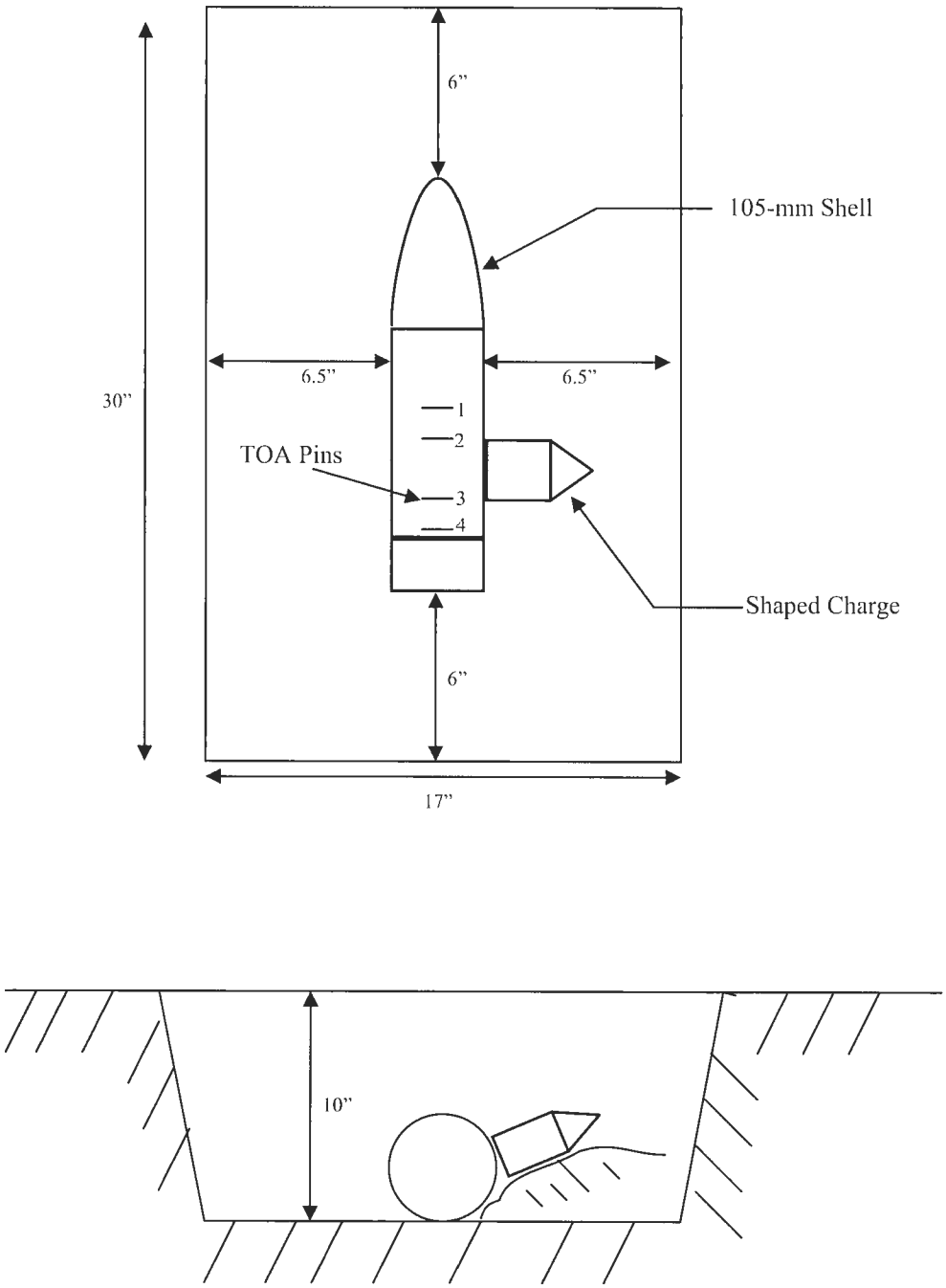
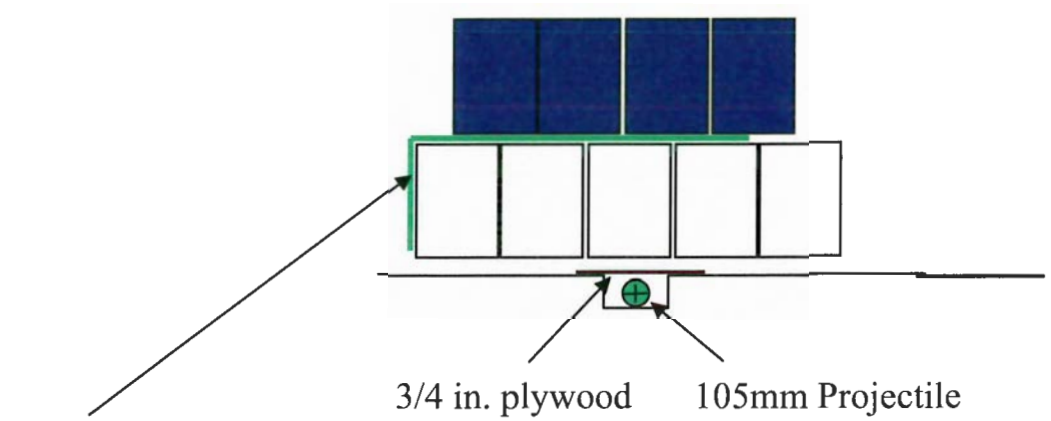
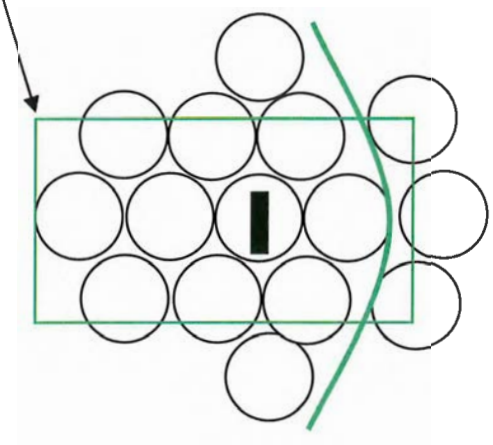


FIGURE 7 – Munition and Initiator Placement for 105 mm M1 Projectiles





Bottom Layer

Top Layer

FIGURE 8 - Test Layout for 105 mm M1 Under 55 Gallon Drums

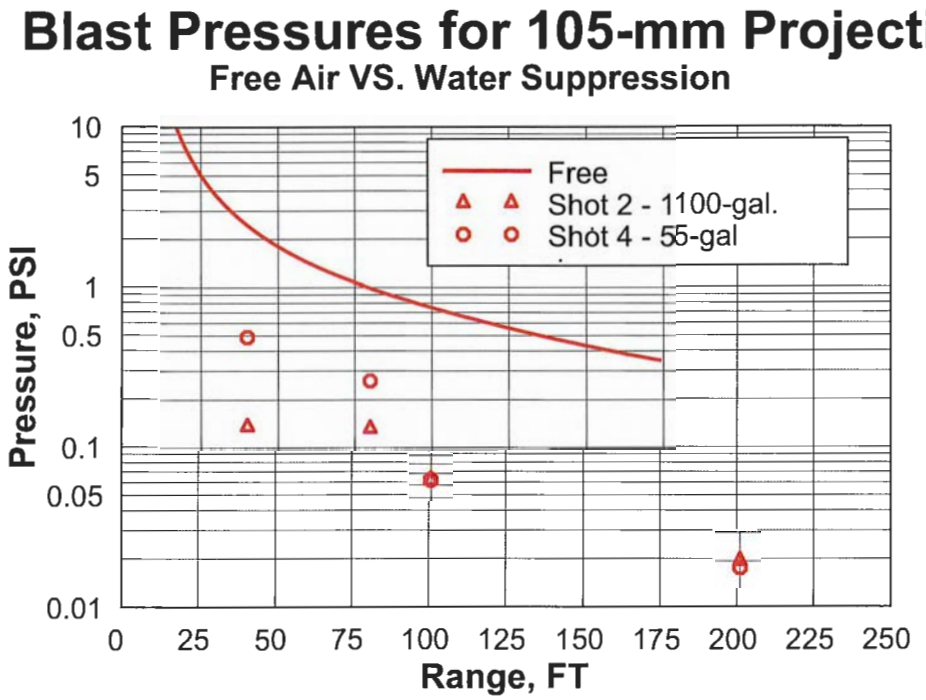


FIGURE 9 - 105 mm M1 Blast Pressures

2.2.3 81 mm M362A Mortar

Two water containment systems were tested with the 81 mm M362A mortar. The first system was two layers of 5 gallon plastic carboys and the second system was a 90 inch diameter inflatable wading pool.

2.2.3.1 Water Contained in 5 Gallon Carboys

After placing the 81 mm M362A with the initiator in the hole (see Figure 10), a half sheet of ¾ inch plywood was placed over the hole and two layers of 5 gallon carboys were placed over the mortar. A total of 31 carboys were used with a witness panel placed between the layers and around the outside of the carboys. This layout is shown in Figure 11.

There was one small fragment hole in the witness panel over the bottom layer of containers and a larger hole about 3 inches long and an inch wide right behind the rear of the munition, probably made by the tail fin. One carboy was found off the side of the stack in the woods at 223 feet and another in a pond about 240 feet off the nose end of the munition. Several were found at distances near 100 feet. Many were still full of water. The tail fin of the mortar was recovered intact directly to the rear of the munition at a distance of 107 feet. Blast pressures from the 81 mm tests are shown in Figure 12.

2.2.3.2 Water Contained in 90 inch Inflatable Wading Pool

After placing the 81 mm M362A with the initiator in the hole, a half sheet of ¾ inch plywood was placed over the hole and a 90 inch diameter inflatable wading pool was placed over the mortar (see Figure 16). The water depth was 18 inches. A witness panel was placed over the pool.

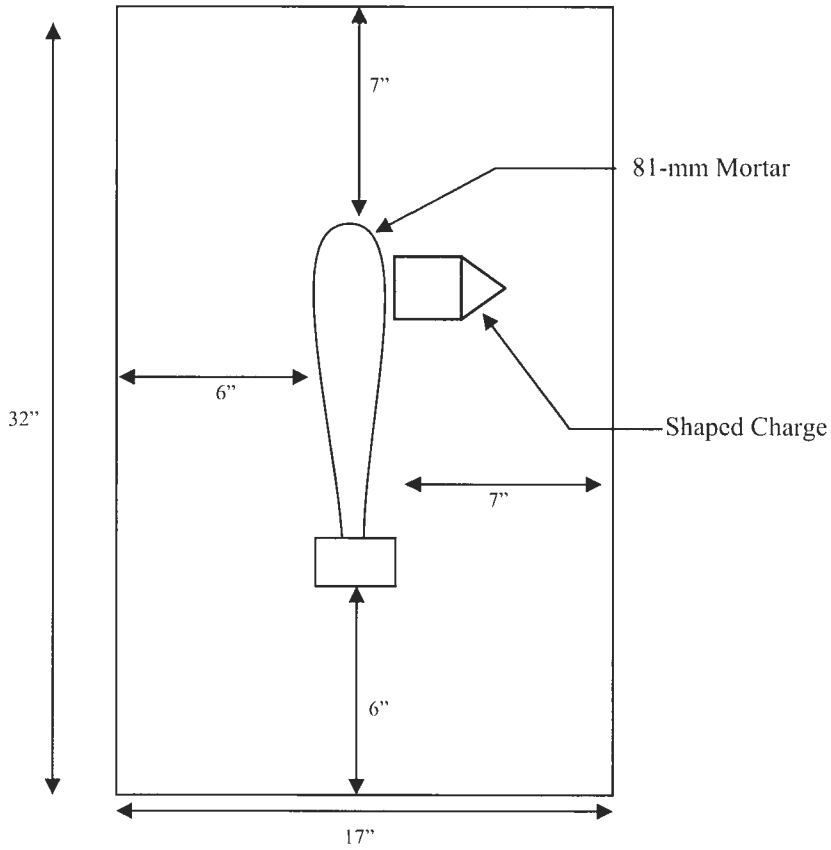
The witness panel was thrown several feet into the air. A hole was blown in the bottom of the pool but the inflated perimeter of the pool was essentially intact. The side of the pool had a small puncture on the inside that caused it to slowly deflate. The witness panel was not perforated.

2.2.4 60 mm M49A4 Mortar

Two water containment systems were tested with the 60 mm M49A4 mortar. The first system was two layers of 5 gallon plastic carboys and the second system was a 90 inch diameter inflatable wading pool.

2.2.4.1 Water Contained in 5 Gallon Carboys

After placing the 60 mm M49A4 with the initiator in the hole (see Figure 13), a half sheet of ¾ inch plywood was placed over the hole and two layers of 5 gallon carboys were placed over the mortar. A total of 11 carboys were used with a



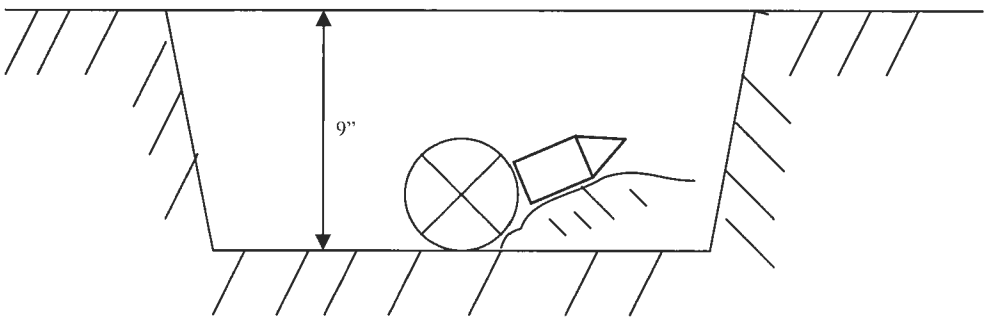


FIGURE 10 – Munition and Initiator Placement for 81 mm M362A Mortars

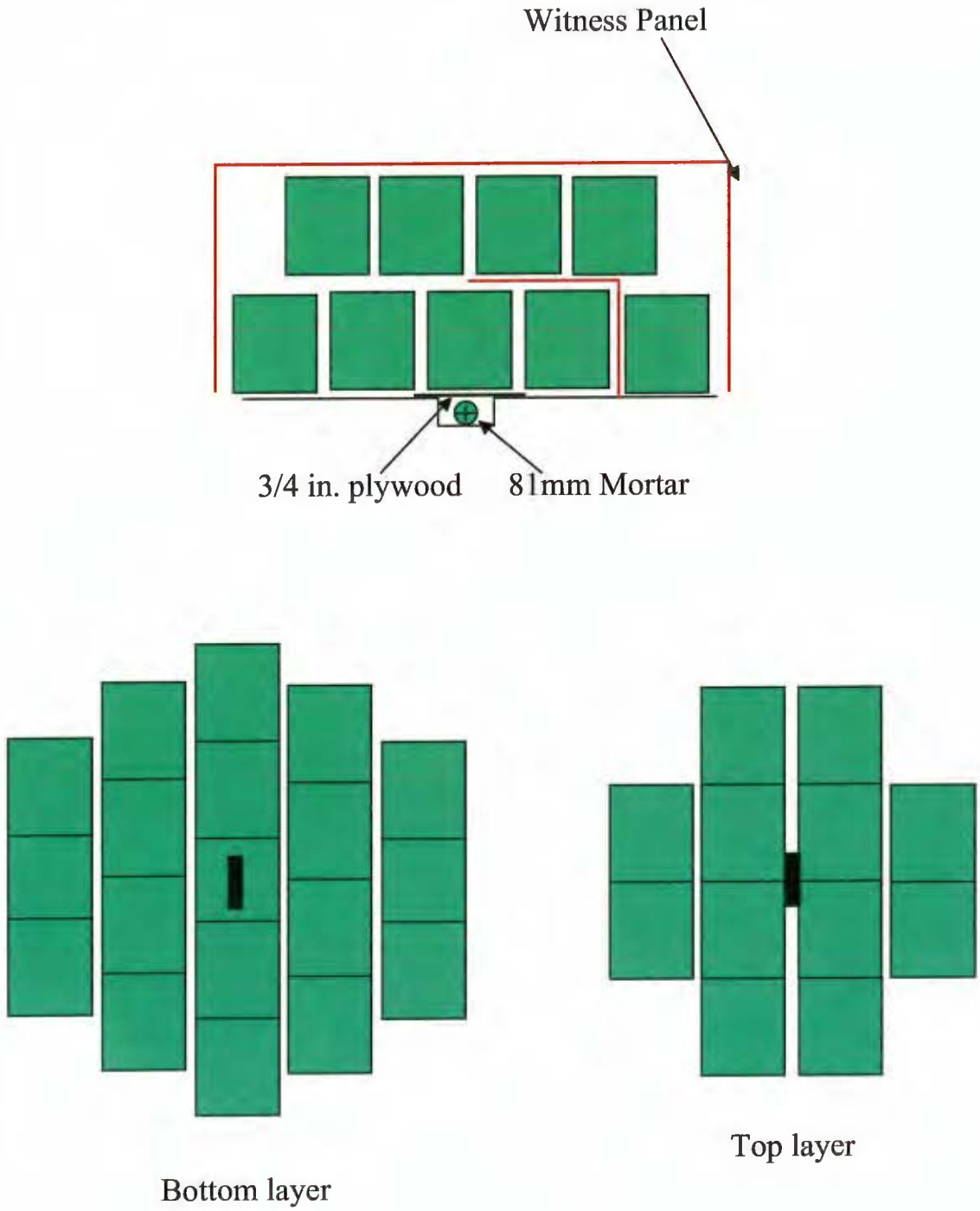


FIGURE 11 - Test Layout for 81 mm M362A Under 5 Gallon Carboys

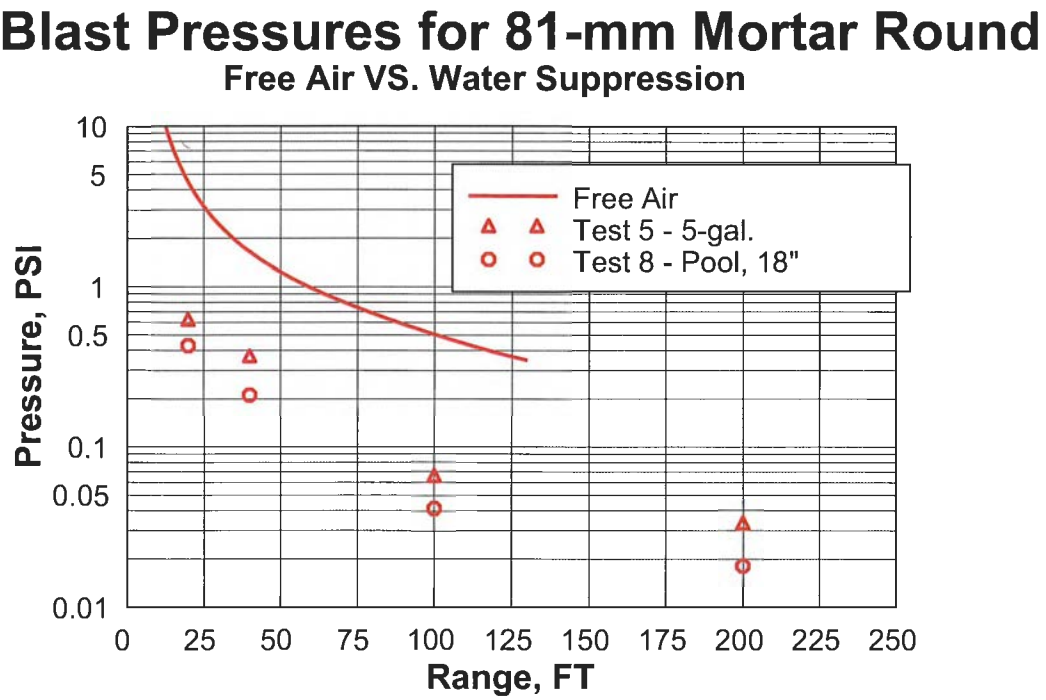


FIGURE 12 - 81 mm M362A Blast Pressures

witness panel placed between the layers and around the outside of the carboys. This layout is shown in Figure 14.

The carboys were thrown more than 100 feet into the air. Those on top landed within 10 feet of the crater. It was observed that the containers on the outer layers are the ones thrown the furthest. The most distant carboy on this test was recovered 44 feet from the nose of the munition. There were no holes in the witness panels. The blast pressures for the 60 mm tests are shown in Figure 15.

2.2.4.2 Water Contained in 90 inch Inflatable Wading Pool

After placing the 60 mm M49A4 with the initiator in the hole, a half sheet of ¾ inch plywood was placed over the hole and a 90 inch diameter inflatable wading pool was placed over the mortar (see Figure 16). The water depth was 18 inches. A witness panel was placed over the pool.

The witness panel was thrown off of the pool. A hole was blown in the bottom of the pool but the inflated perimeter of the pool was not punctured. There were no perforations or even dents in the witness panel.

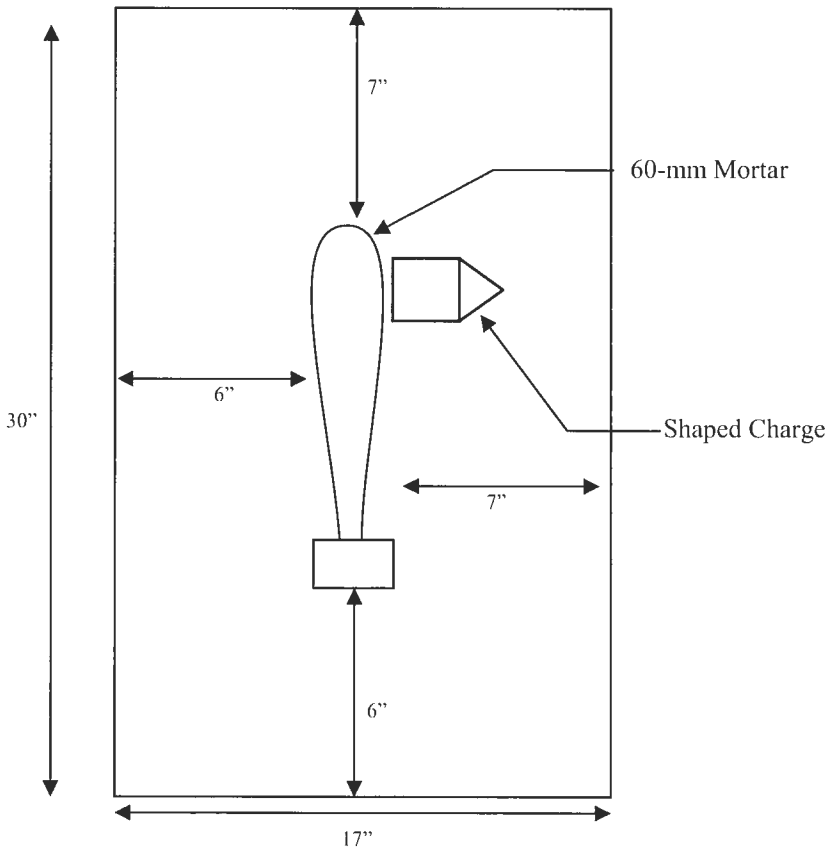
2.2.5 Phase Two Summary and Conclusions

Water is an excellent medium for mitigating blast and fragmentation due to the intentional detonation of unexploded ordnance. Test results show that noise due to detonation is reduced by the water and the fragments from the munitions can be defeated by water.

The best results were obtained using single containers for the water. When multiple containers are used fragments can travel through gaps between containers and the containers are thrown some distance by the blast. Also, containers that are not rigid seem to be a better option than rigid containers because the pieces of the non-rigid containers are smaller, lighter (non-hazardous) and don't travel as far. Non-rigid containers require a more level ground surface but the sides could be supported by soil or sandbags.

As the required thickness of water increases, rigid sides are necessary to contain the large volumes of water and the rigid sides may contribute to the secondary fragment distances. The small pools are readily available at local stores during the spring and early summer but may be difficult to obtain at other times. The agricultural tanks are available any time but may need to be ordered requiring advance planning.

Whenever possible a half sheet (4 ft x 4 ft) of plywood rather than a full sheet (8 ft x 8 ft) should be used under the charge. All of the plywood should be covered by the water container(s) to minimize debris from the plywood.



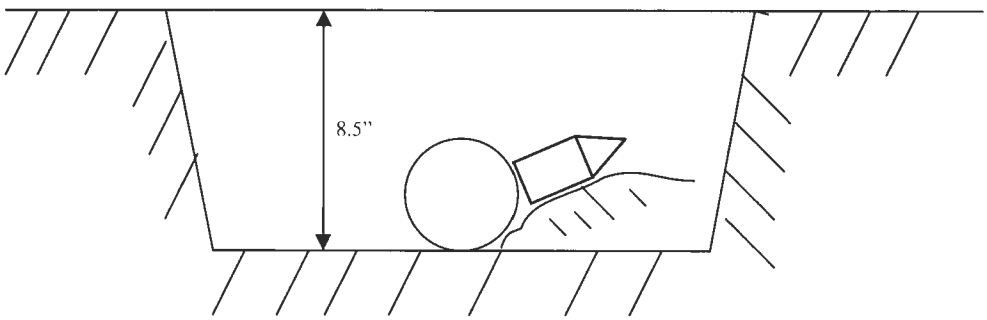
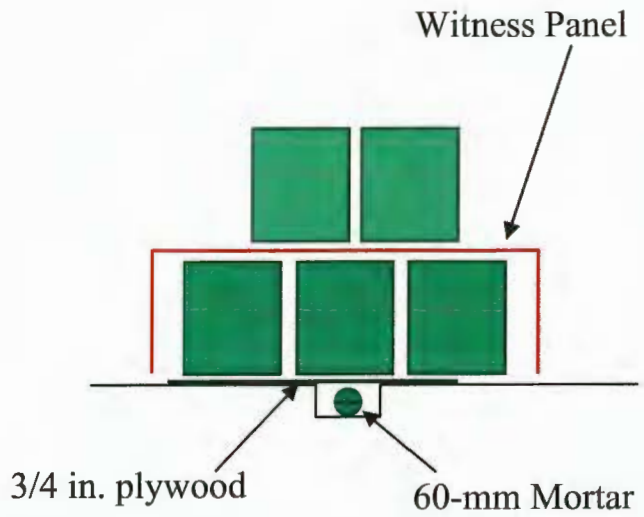
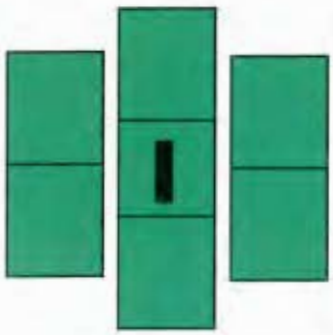


FIGURE 13 – Munition and Initiator Placement for 60 mm M49A4 Mortars





Bottom layer

Top layer

FIGURE 14 - Test Layout for 60 mm M49A4 Under 5 Gallon Carboys

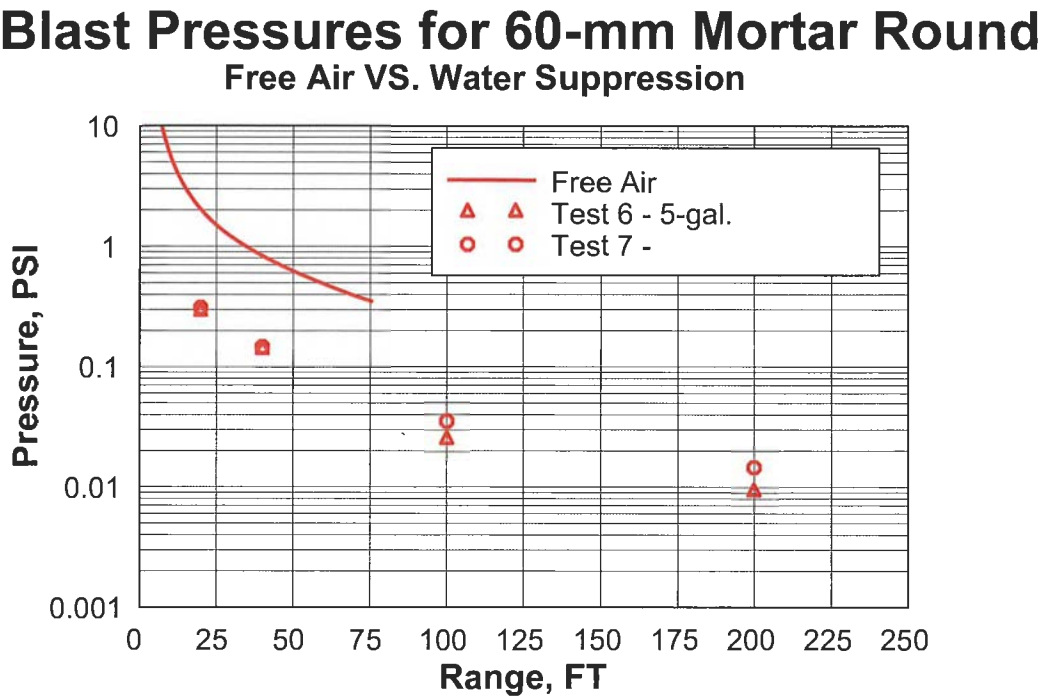


FIGURE 15 - 60 mm M49A4 Blast Pressures

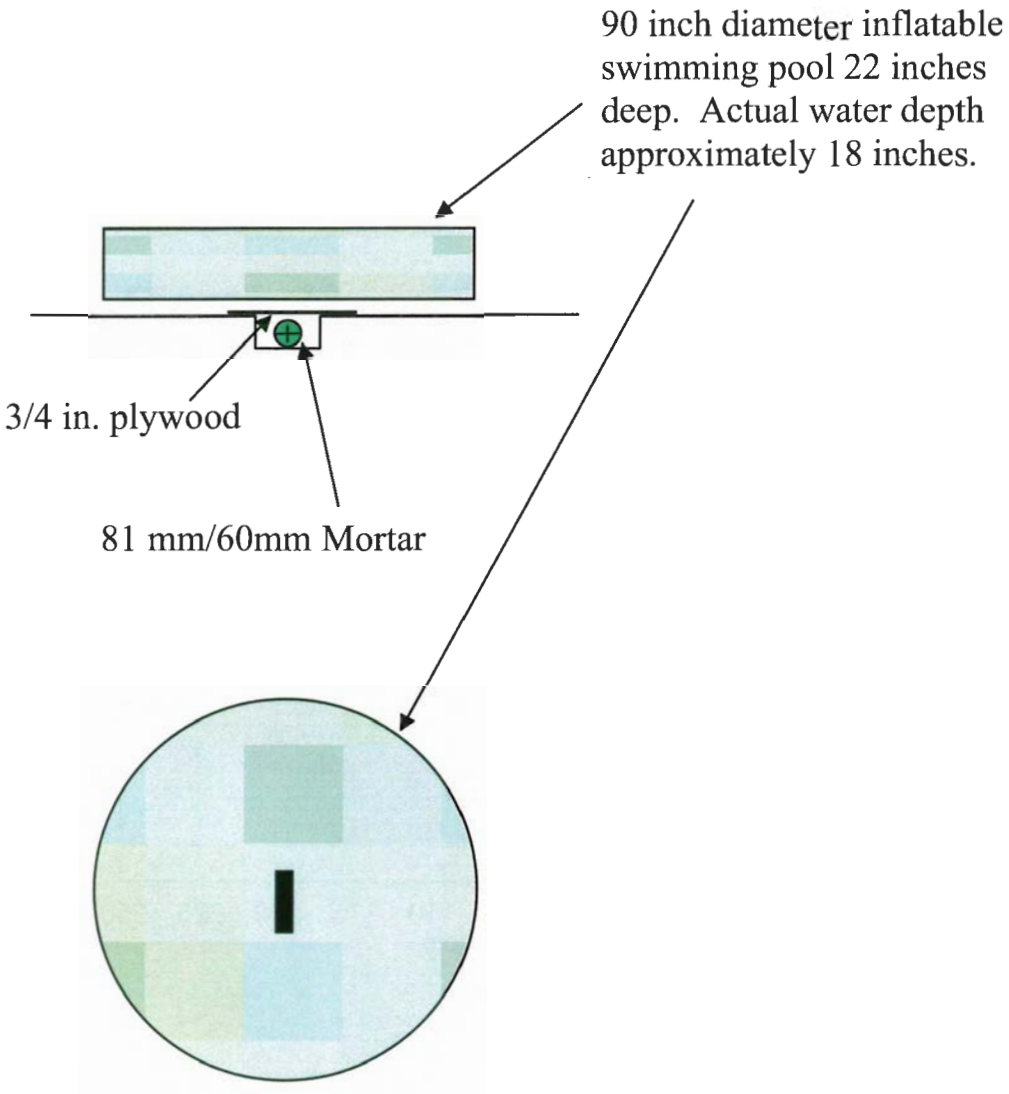


FIGURE 16 - Test Layout for 81 mm M362A and 60 mm M49A4 Under Inflatable Pool

Care should be taken to insure that there are no water spills of sufficient volume to the hole in which the munition is located. This could lead to a misfire. Also, as observed in phase one, the water may cause sufficient confinement to increase fragment size and penetration capabilities.

3.0 Water Mitigation for Intentional Detonations

3.1 Water Containment System

Based on the results from the Phase Two tests, the fragments from an intentional detonation of a 155 mm M107 or a 105 mm M1 projectile are defeated using an 1100 gallon agricultural tank filled with water. The 55 gallon drums are not a viable system for defeating fragments from an intentional detonation because of the gaps between the cylindrical barrels. The fragments from an intentional detonation of an 81 mm M362A or a 60 mm M49A4 mortar are defeated using either a system of 5 gallon plastic carboys or a 90 inch diameter, 18 inch deep wading pool. The results of the Phase Two tests are summarized in Table 7. To be conservative, the maximum secondary debris throw distance shown in Table 7 is 10% greater than the measured maximum secondary debris throw distance. Due to the small values, the overpressures have not been increased from the measured values.

TABLE 7 – Summary of Results From Phase Two Tests

Munition	Water Containment System	Max. Secondary Debris Throw Distance (ft)	Max Peak Overpressure (psi)				
			@ 20 ft	@ 40 ft	@ 80 ft	@ 100 ft[A]	@ 200 ft[A]
155 mm M107	1100 gal. Tank	275		0.28	0.15	0.0415	0.018
105 mm M1	1100 gal. Tank	198		0.136	0.132	0.064	0.02
81 mm M362A	5 gal. Carboys	264	0.61	0.36		0.064	0.0325
81 mm M362A	Inflatable Pool	See note	0.43	0.21		0.0415	0.018
60 mm M49A4	5 gal. Carboys	48	0.29	0.14		0.0251	0.0092
60 mm M49A4	Inflatable Pool	See note	0.31	0.147		0.0352	0.0145

[A]Pressure calculated from measured sound level.
Note: Inflatable pool did not produce any hazardous secondary debris.

The four munition types tested do not cover all of the munitions that may be encountered. To determine the water containment system required for a particular munition other than those tested, the approach is as follows:

(1) Determine the initial fragment velocity (v_f) in ft/s, the maximum fragment weight (W_f) in pounds, and the equivalent weight kinetic energy ($W_f v_f^2/2$) in lb-ft^2/s^2 for the particular munition.

(2) Identify the munition with the next largest kinetic energy from the four tested munitions.

(3) Use the water containment system from Table 7 for the tested munition with the next largest kinetic energy shown.

The maximum fragment weight, the initial fragment velocity, and the resulting kinetic energy for a variety of munitions are provided in Table 8. Table 8 also shows the suitable water containment system for these munitions. The munition/initiator placements and water containment systems are detailed in Figures 3, 6, 7, 10, 11, 13, 14, and 16. The maximum fragment weight and the initial fragment velocity values have been determined with the Mott and Gurney equations, as presented in TM 5-1300 [1] and detailed in HNC-ED-CS-S-98-1 [2]. This procedure should not be used to extrapolate water containment systems for munitions larger than the 155 mm M107 projectile.

3.2 Minimum Separation Distance

A minimum separation distance is required for any detonation. This minimum separation distance applies to everyone, both public and operational personnel. The minimum separation distance is the maximum of the debris throw distance, the distance to an overpressure of 0.065 psi (corresponds to K328 = $328W^{1/3}$, where W is the net explosive weight), or 200 ft. For all munitions tested the overpressure at 200 ft was substantially less than 0.065 psi. In some cases, the debris throw distance exceeds 200 ft. The minimum separation distances are listed in Table 8.

4.0 Summary and Conclusions

A test program has been performed to determine the effects of water for mitigating fragments and blast effects due to an intentional detonation of a munition. Tests were performed using four different munitions and two water containment systems for each munition.

The results of these tests have been used to develop guidelines for the use of water to mitigate fragments and blast effects due to an intentional detonation of a munition. Methods for determining the required water containment system and the resulting minimum separation distance are detailed in Section 3.0. Figures 3, 6, 7, 10, 11, 13, 14, and 16 show the resulting munition/initiator configuration and water containment systems.

In addition to mitigating the fragments and the overpressure, water quenches the fireball due to an explosion. Therefore, this system insures that there in no fire hazard from an intentional detonation.

5.0 References

1. TM 5-1300, "Structures to Resist the Effects of Accidental Explosions", Departments of the Army, the Navy, and the Air Force, November 1990.

2. HNC-ED-CS-S-98-1, "Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives", M. Crull, U.S. Army Engineering and Support Center, Huntsville, January 1998.

TABLE 8 – Water Containment System and Minimum Separation Distance

Munition	Max Fragment Weight (lb)	Critical Fragment Velocity (fps)	Equivalent Weight Kinetic Energy 10^6 ($lb\text{-}ft^2/s^2$)	Water Containment System	Minimum Separation Distance (ft)
20 mm M56A4	0.00058	3183	0.0029503	5 gal carboys/ inflatable pool	200
25 mm M792	0.00820	4256	0.0742528	5 gal carboys/ inflatable pool	200
M31 Rifle Grenade[A]	0.000361	11642	0.0244643	5 gal carboys/ inflatable pool	200
VB Rifle Grenade Mark I	0.0078	3660	0.0522428	5 gal carboys/ inflatable pool	200
37 mm Mk I, LE Practice	0.034207	1368	0.0320079	5 gal carboys/ inflatable pool	200
37 mm MK II	0.02953	5758	0.4894774	5 gal carboys	264
				inflatable pool	200
40 mm M406	0.00036	4508	0.0036986	5 gal carboys/ inflatable pool	200
GP Grenade M42 (submunition)[A]	0.00035	5805	0.0058803	5 gal carboys/ inflatable pool	200
40 mm MK2 Mod 0	0.03306	3605	0.2148275	5 gal carboys/ inflatable pool	200
40 mm HEDP M433	0.00023	11313	0.0147821	5 gal carboys/ inflatable pool	200
M73 Submunition	0.00200	8059	0.0649475	5 gal carboys/ inflatable pool	200
57 mm Chinese	0.01940	5500	0.2933645	5 gal carboys/ inflatable pool	200
57 mm M306	0.01291	3495	0.0788236	5 gal carboys/ inflatable pool	200
MK II Grenade	0.014217	3425	0.0833871	5 gal carboys/ inflatable pool	200
M39 Submunition	0.00011	2338	0.0003006	5 gal carboys/ inflatable pool	200
2.36 " Rocket (Case Only)	0.001035	8888	0.0408807	5 gal carboys/ inflatable pool	200
60 mm M49A3	0.02367	5114	0.3095835	5 gal carboys/ inflatable pool	200
60 mm M49A5	0.01660	6290	0.328382	5 gal carboys/ inflatable pool	200
M15 WP Grenade	0.00340	2685	0.0122557	5 gal carboys/ inflatable pool	200
BLU-59, BLU-26, BLU-36 Submunition	0.00152	6278	0.0299541	5 gal carboys/ inflatable pool	200

TABLE 8 (cont) - Water Containment System and Minimum Separation Distance

Munition	Max Fragment Weight (lb)	Critical Fragment Velocity (fps)	Equivalent Weight Kinetic Energy 10^6 ($lb\text{-}ft^2/s^2$)	Water Containment System	Minimum Separation Distance (ft)
Fragmentation Grenade, M67 (approx)	0.0011828	7006	0.0290283	5 gal carboys/ inflatable pool	200
2.75" M229 Rocket	0.005217	5569	0.0808994	5 gal carboys/ inflatable pool	200
6 lb Incendiary Bomb	0.0021	9431	0.0933909	5 gal carboys/ inflatable pool	200
FMU 54A/B Fuze	0.0064491	9031	0.2629909	5 gal carboys/ inflatable pool	200
75 mm M48	0.15303	3471	0.921814	1100 gal tank	200
3"/50 AP Mk 29	0.42992	1058	0.240619	5 gal carboys/ inflatable pool	200
3 in Stokes Mortar	0.04360	6189	0.835023	1100 gal tank	200
M1A1 Anti-Tank Mine	0.0138139	9891	0.6757199	5 gal carboys	264
				inflatable pool	200
4 lb Frag Bomb M83	0.076176	3266	0.4062754	5 gal carboys	264
				inflatable pool	200
81 mm M374	0.03083	6721	0.6963488	5 gal carboys	264
				inflatable pool	200
81 mm M56	0.03270	5724	0.5356943	5 gal carboys	264
				inflatable pool	200
3.5" M28A2 Rocket Case	0.05242	6126	0.9836056	1100 gal tank	200
90 mm M71	0.3426	2335	0.9339661	1100 gal tank	200
90 mm HEAT M371	0.124	3075	0.5862488	5 gal carboys	264
				inflatable pool	200
20 lb Frag Bomb M41	0.33321	3303	1.8176287	1100 gal tank	275
4 in Stokes Mortar	0.07820	6336	1.5696915	1100 gal tank	200
105 mm M1	0.20573	4055	1.6914479	1100 gal tank	200
105 mm HEAT M456	0.07010	6326	1.4026406	1100 gal tank	200
106 mm M344 (Case)	0.0630543	6238	1.2268048	1100 gal tank	200
4.2 in M3A1	0.07869	6391	1.6069785	1100 gal tank	200
British Naval 4.5"	0.408519	2461	1.237102	1100 gal tank	200
4.5 inch rocket M8	0.1485	5352	2.1268099	1100 gal tank	275
4.7 in Mark I	0.59147	3566	3.7606709	1100 gal tank	275
120mm M356	0.32909	3493	2.0076278	1100 gal tank	275
5 in 38 Caliber Mk 35	0.36485	3563	2.3158861	1100 gal tank	275
6" Trench Mortar	0.11418	3939	0.8857615	1100 gal tank	200
155 mm M107	0.64821	3426	3.8041893	1100 gal tank	275

[A]These rounds contain a shaped charge. Care must be taken that the destruction method does not allow formation of a jet and fragment slug.

STANDARD OPERATING PROCEDURE
NUMBER 2

EXPLOSIVE STORAGE AND TRANSPORTATION (ESAT)

SOP 2 - EXPLOSIVE STORAGE AND TRANSPORTATION (ESAT)

2.1 INTRODUCTION

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, accountability, and transportation of demolition material and munitions and explosives of concern (MEC).

2.2 SCOPE

This SOP applies to all site personnel involved in the acquisition, receipt, storage, handling, inventory and transportation of demolition material and MEC. It is to be followed by all Parsons and subcontractor personnel involved in any activity involving demolition material.

2.3 REFERENCES

Procedures and information contained in this document were obtained from the below-listed references:

- ATF P 5400.7, ATF-Explosives Law and Regulations;
- DoD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives;
- DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards;
- EM 385-1-97, Explosives Safety and Health Requirements Manual;
- EM 385-1-1, USACE Safety and Health Requirements Manual; and
- EM 1110-1-4009, Military Munitions Response actions.

2.4 RESPONSIBILITIES

2.4.1 Project Manager

The Project Manager (PM), in conjunction with the Senior UXO Supervisor (SUXOS) or site manager (SM), is responsible for the initial quantity and type of demolition material ordered. This initial requisition should be of sufficient quantity to support the project for a minimum 90-day period. In the event the project is scheduled to run for less than 90 days, every effort will be made to place one requisition meeting the anticipated needs.

2.4.2 UXO Safety Officer

The Parsons UXO Safety Officer (UXOSO) is responsible for determining the specific site requirements for licensing, permitting, and placards. The UXOSO is also responsible to ensure the handling, storage, transport, and use of demolition material is in accordance with the approved work plan, SOPs, and federal, state and local regulations.

2.4.3 UXO Quality Control Specialist

The Parsons UXO Quality Control Specialist (UXOQCS) will oversee all subsequent requisitions of demolition material and will review all Purchase Order Requests (POR) for

demolition material to ensure that approved Explosive Siting and Explosive Management Plans are not violated. The UXOQCS is also responsible for the inspection and auditing of the entire operation and reporting any findings to the PM. These inspections will include the acquisition procedure, documentation, storage, and transport.

2.4.4 Senior UXO Supervisor

The Parsons or subcontractor Senior UXO Supervisor (SUXOS) is responsible for acquiring the initial quantity and type of demolition material, submit all subsequent requests for demolition material and conduct periodic inspections of the magazine storage areas and their contents.

2.4.5 Vehicle Driver

The vehicle driver will, at a minimum, be a UXO Tech III qualified and have a valid driver's license. This is to ensure that the driver is both experienced with and knowledgeable of demolition material. For additional transportation requirements see section 2.8.

2.5 ACQUISITION

2.5.1 Requisitions

Prior to ordering demolition materials, the Purchase/Receipt Authorization List (Figure 1) must be completed and forwarded to the explosive distributor(s), along with a copy of the Parsons BATF License. Prior to the initial acquisition of explosives, Parsons must have received work plan approval from the Contracting Officer. The commercial explosives identified in Table 1 are the items approved for use. Upon approval of the WP, the initial acquisition will be processed and must be on site prior to commencing intrusive activities and all subsequent shipments must arrive in such a manner to ensure there is no break in operations.

2.5.2 Receipt

Only those individuals named on the Authorization list may sign for explosives from the shipper. In order to ensure that the quantity shipped is the same as the quantity listed on the shipping documents, either the SUXOS or UXOQCS, or in his absence the UXOSO, will inventory the shipment prior to signing for it.

2.5.3 Shipping Documents

The explosive supplier's Bill of Lading (B/L) and the freight company's shipping document generally accompany explosive shipments. The initial inventory will include reconciling the two documents with the actual shipment. Regardless of the outcome of the initial inventory, one copy of the B/L and the freight company-shipping document will be attached to a copy of the POR and the PO. One copy of each of the four documents will be kept on file on site and one complete copy forwarded to the corporate office.

Figure 1 - Explosives Purchase / Receipt / Authorization List

Explosives Purchase / Receipt / Authorization List

Street Address and County: (Home Office)

Street or Post Office Box Address and County: (Field Office)

Federal License #: Expiration Date:

The following individuals are agents, employees, or representatives of the undersigned, and are authorized to order or acquire explosive materials on behalf of Parsons.

Name and Home Address	Driver's License No.	Soc. Sec. Number	Place of Birth

The undersigned certifies the foregoing information to be true and correct to the best of his knowledge and belief, and that he will communicate any additions or deletions to the foregoing list to Parsons.

OE Group Operations Manager and Date (Type or print)	Signature and Date

Table 1 - DOD Hazard Classifications for Commercial Explosives

DOT EX #	NOMENCLATURE	DOD HAZARD CLASS	DATE
9806054	Cord, Detonating	1.1D	02 Dec 98
9303282	Cord Detonating, Commercial	1.1D	14 Jan 98
9207009A	Cord, Detonating	1.4D	04 Apr 00
9202035	Cord, Detonating, Commercial	1.1D	19 Sep 97
8210044	Cord, Detonating	1.1D	12 Jan 99
9709010	Cap, Blasting, Electric, Instant	1.4B - Only when in DOT packaging	27 Jan 99
9707051	Cap, Blasting, Non-electric	1.4B – Only when in DOT packaging	2 Dec 98
9303278	Cap, Non-electric, Commercial	1.1B	14 Jan 98
9104118	Cap, Blasting, Electric, Commercial	1.4B	19Sep 97
8511062	Cap, Blasting, Non-electric, Commercial	1.4B	27 Oct 97
9803207	Detonator, with Fuse Assembly	1.1B	12 Jan 99
9303277	Detonator, Cap, Electric, Commercial	1.4B	04 Apr 00
8912113	Demo Charge, C-4, Commercial	1.1D	27 Jan 99
9608031	Booster, 1 LB	1.1D	14 Jan 98
9308432	Booster, Pentolite	1.1D	14 Jan 98
8611125	Booster, Pentex	1.1D	14 Jan 98
9303285	Booster, Cast. Austin	1.1D	14 Jan 98
9508033	Fuse Lighter, Commercial	1.4S	27 Oct 97
9201092	Fuse, Time, safety	1.4S	2 Dec 98
8311105	Fuse, Safety, Commercial	1.4S	27 Oct 97
9404156	Shock Tube, Shock Star MS	1.4S	14 Jan 98
9106259	Shock Tube, Excel MS	1.4S	14 Jan 98
9608028	Shaped Charge, Commercial	1.4D	19 Sep 97
9405290	Shaped Charge, Commercial	1.4D	10 Mar 99
9409002	Shaped Charge, commercial	1.4D	27 Oct 97
8601111	Shaped Charge, Commercial	1.4S	10 Mar 99

2.5.4 Receipt Discrepancies

Upon receipt, the type, quantity, and lot number of each item will be checked against the manifest and entered on the Magazine Data Card(s) (Figure 2). In the event there is a discrepancy between the amount shipped and the amount received, the SUXOS or the UXOQCS will immediately contact the explosive supplier and inform him of the discrepancy. It then is the responsibility of the supplier and shipper to rectify the situation and inform Parsons of the results. The supplier and/or shipper must then correct their documents and forward them to the site. In any event, only the amount received will be entered on the Magazine Data Card(s), which will be annotated for each transaction.

2.5.5 Reporting Lost or Stolen Explosives

5.5.1 Loss or theft of explosives will be reported as required in 27 CFR Part 55, Sub part C paragraph 55.30. ATF Form 5400.5 will be completed, within 24 hours and forwarded to the ATF, with a copy to the contracting officer. A copy of this form is provided in Figure 5.

5.5.2 The following individuals will be notified immediately upon discovery of theft of explosive:

- Site Manager, Parsons Project Manager, and USAESCH PM
- Explosives Distributor
- Bureau of Alcohol, Tobacco and Firearms (ATF) at 1-800-800-3855

2.6 STORAGE AND SECURITY

Approved explosive storage facilities may be provided at the site, either by the U.S. Army Corps of Engineers (USACE) or by the installation. Parsons will use the existing magazines for explosive storage and comply with local storage criteria and procedures. The SUXOS and/or UXOQCS will prepare Magazine Data Card(s) (Figure 2). If no existing explosives storage facilities are available, Parsons will:

- Use approved BATF Type 2 structures;
- Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards;
- Install sufficient magazines to comply with the explosive compatibility requirements, (i.e., bulk explosives, initiating explosives);
- Establish security, such as fencing, to prevent unauthorized access and/or theft, as required.

Figure 2 - Magazine Data Card

					MAGAZINE DATA CARD			
Product Code / FSN:		Nomenclature:			Site Name: Address:			
Date Code / Lot Number		Hazard Class	UN or NA	Quantity / Case:				
Date	Bill of Lading /Voucher Number	Received From	Quantity Received	Quantity Issued	Issued To	Current Balance	Initials	
							Issuer	Receiver

2.6.1 Exterior Construction

BATF Type 2 magazines are required to have the exterior and doors to be constructed of not less than 3/16-inch steel and lined with at least two inches of hardwood. Magazines with top openings will have lids with water-resistant seals, or which overlap the sides by at least one inch when in a closed position.

2.6.2 Hinges and Hasps

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

2.6.3 Locks

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

2.6.4 Signage/Placards

ATF and DoD require that all magazines be appropriately posted for content hazard class, fire fighting hazard, and an emergency notification list. Magazines will be placarded in accordance with DoD 4145.26M and DA Pam 385-64. In most instances, this will require a Fire Division Class 1 for the recovered UXO storage magazines and a Fire Division Class 3 for the demolition material, excluding detonators, which are Fire Division Class 4. If in doubt label the contents with the next highest hazard. In the event there are two different fire division or hazard class items in the same magazine, use the higher hazard division/class placard.

2.6.5 Lightning Protection

Appropriate lightning protection will be installed on all site(s), IAW *DA Pam 385-64, Chapter 6, paragraph 6-15; Table 6-1 and 6-2, and Chapter 12, paragraphs 12-5 & 12-8: Table 12-1.*

- A qualified person will conduct a resistivity test, over several points of the proposed site. Test boring will be used for deciding on an adequate earth electrode system. The minimum resistance is 25 ohms measured on a Ground Resistance Tester (Biddle Ground Megger®).
- An Earth Electrode Subsystem will be placed at uniform intervals around the protected facility as required; grouping of earth electrodes on one side of a facility is prohibited. Earth electrodes will be set not less than 3 feet or more than 8 feet from the structure(s).
- Grounding Rods will not be less than ¾" in diameter and 10 feet in length. Rods will be copper-clad steel, solid copper or stainless steel and free of paint or other non-conductive coating. The minimum number of rods for the facility is two, yet may be increased to assist in the reduction of resistivity. Rods will be located clear of paved surfaces, walkways and roadways and will be driven into the ground so that the tops are at least 12" below finished grade. In the event of shallow topsoil over bedrock or dense coral preventing the burial of rods, use extended down conductors or buried open plates, as described in Chapter 3 of National Fire Protection Association 780.

- Bonding is used to reduce the possibility of a side flash and to ensure lightning current produces no electrical potential differences. For a building 36 feet in height or less, a bonding strap is required for large masses of metal (400 in sq) located on the exterior (door), or within the facility.
- Lightning warning systems provide a positive, reliable means of continuously monitoring and recording atmospheric voltage gradient. For those sites without a lightning warning system, the UXOSO will establish criteria for terminating ammunition and explosive operations and evacuate the facility to the MSD distance, as outlined in the Work Plan.
- Periodical inspections and test requirements for the grounding system will be accomplished every 6 months for visual inspections and every 24 months for electrical tests. The grounding system will have a resistance of 25 ohms or less and the bonding strap 1 ohm or less. The results of these tests will be kept on file at the site.

Sites that do not need a Lightning Protection System (LPS) must meet the following requirements, in accordance with *EM 1110-1-4009, Chapter 11.*

- The magazine is constructed of metal that is 3/16-inch steel or larger.
- The magazine is grounded as described in Figure 3.
- The magazine is located at least 7.0 feet from the nearest fence. Figure 3 is an example of a typical site not requiring an LPS.

2.6.6 Fencing Protection

Appropriate fencing (physical security) protection will be installed on all site(s), in accordance with *AR 190-11, paragraph 5-3*:

- Fence fabric will be of chain link (galvanized, aluminized or plastic coated woven steel) 2-inch square mesh 9-gauge diameter wire, including coating.
- Posts, bracing and other structural members will be located on the inside of the fence fabric. Galvanized steel or aluminized wire-ties equal in gauge to fencing will be used to secure the fence fabric to the posts or other structural members.
- The minimum height of the fence fabric will be 6 feet without an outrigger.
- The bottom of the fence fabric will extend to within 2 inches of firm ground. A 9-gauge retaining wire, of the same material as the fence, will be interwoven along the bottom portion of the fence from post to post, in order to prevent anyone from pushing the fence in at the bottom. Surfaces will be stabilized in areas where loose sand, shifting soils, or surface waters may cause erosion and thereby assist an intruder in penetrating the fenced area. Where surface stability is not possible or is impracticable, concrete curbs, sills or other suitable type anchoring devices, extending below ground level will be provided.
- The barrier will have a minimum number of vehicular and pedestrian gates, consistent with the operational requirements. These gates will be structurally comparable to the adjacent fence. Gates will be provided with an approved lock and hinge pins and hardware will be welded or otherwise modified to prevent easy removal.

2.6.7 Emergency Notification List

An emergency notification list containing the names, telephone numbers, and local addresses of the individuals to be notified in the event of an emergency, will be posted on the outside and inside of the magazine door. These individuals should be the same individuals authorized to sign for explosives, as well as the site manager and UXOSO if they are not on the authorized signature list.

2.6.8 Compatibility

Explosive compatibility will be maintained in accordance with *DA PAM 385-64 and TM9-1300-206.* Table 2 lists the various storage compatibility groups and Table 3 is the storage compatibility chart. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, a waiver will be requested IAW DOD 6055.09-M., and then a barricade, such as sandbags, within the magazine, will physically separate the incompatible items.

2.6.9 Key Control

Magazines will remain locked except when receipts and issues are being made. The two locks on the magazines will require two different keys to unlock. The SUXOS will keep one key and the second key will be kept by the UXOQCS, or in his absence, the UXOSO. This procedure ensures that no one individual can gain access to the magazines.

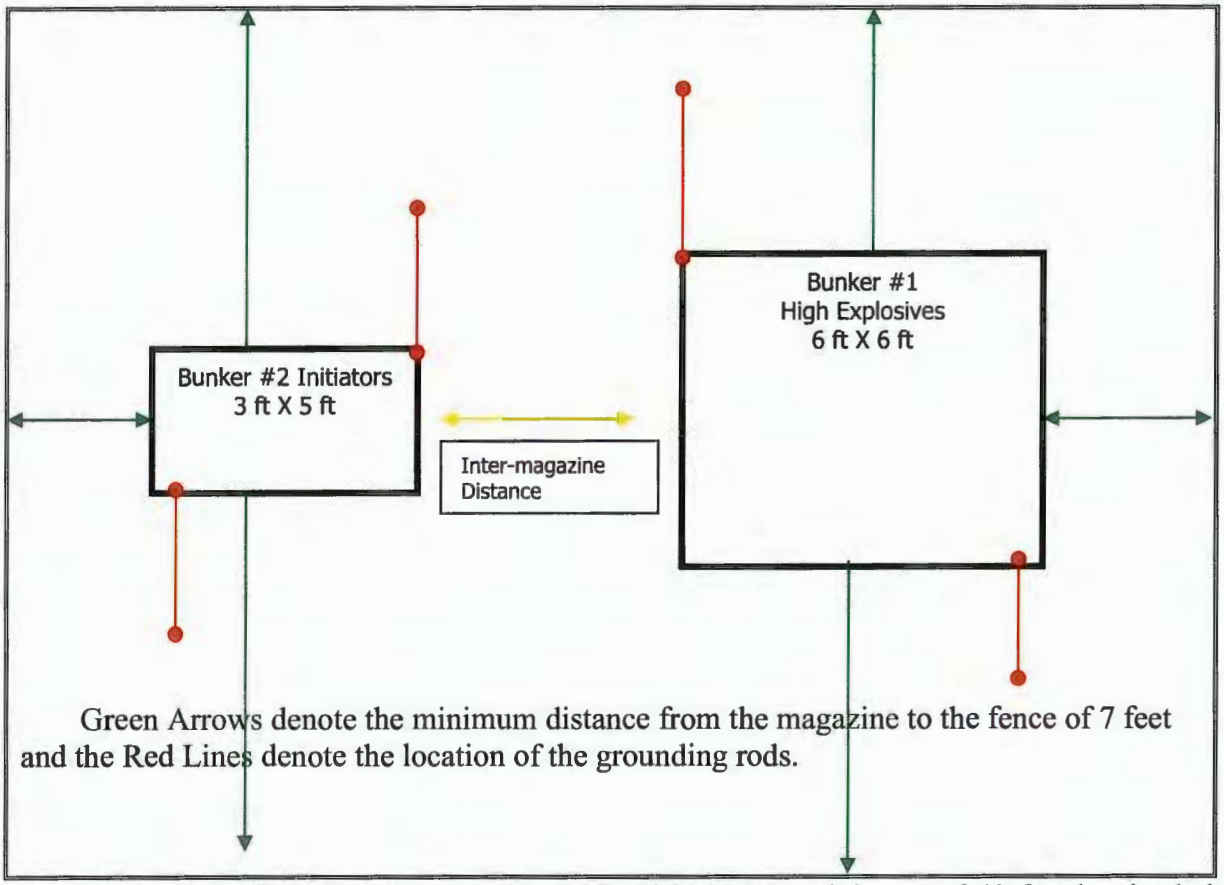
2.6.10 Inspection

At the start of each workday, a physical check will be made of the magazine storage area to ensure security has not been compromised.

2.6.11 Security

Physical security of the explosive storage location, if on a military installation, is provided by the installation. Parsons provides security of the explosive storage location on civilian property, which consists of the required fencing and daily inspections excluding non-work days unless the magazine is considered to be vulnerable to being vandalized.

Figure 3 - Typical Layout of a Non-LPS Storage Site



Notes: Based on *Table V3.E3.T5, DOD 6055.09-M* a minimum of 42 feet barricaded and 84 feet unbarricaded for inter-magazine distance (100 lbs NEW) is required (yellow arrow). The fenced area is 1,520 square feet, based on 76ft in length and 20ft wide. It is recommended that a single magazine, equipped with an attached detonator outrigger be used whenever possible in order to decrease the size of the fenced area required.

Table 2 - Storage Compatibility Groups

STORAGE COMPATIBILITY GROUPS FOR EXPLOSIVES AND AMMUNITION	
GROUP A	
Cyclonite (RDX), dry	Mercury fulminate, wet
HMX, dry	PETN, dry
Lead azide, wet	RDX (cyclonite), dry
Lead styphnate, wet	Tetracene, wet
GROUP B	
Fuses (except chemically-actuated fuses containing ampules which may initiate, directly or indirectly, explosives and explosives-loaded components which are assembled in the conventional manner to form the finished explosive fuse).	Detonators
	Mines, practice, AP, M17
	Percussion elements
	Primer detonators
GROUP C	
Ammunition, blank and saluting, cannon	Cartridge, 90mm, canister, AP
Ammunition, .50 caliber, except API/incendiary	Cartridges, practice, over 40mm
Ammunition, 20mm, practice and high pressure test	Catapults, aircraft ejection seat, M3A1, M4A1, M5
Ammunition, 25mm, with inert projectile	Charge, propelling, not assembled to projectiles EC powder
Ammunition, 27mm, caseless	Detonating cord (primacord)
Ammunition, 30mm, ball and high pressure test	Nitrocellulose
Ammunition, 30mm, practice and training	Fuel (solid), emergency power unit
Ammunition, 37mm and 40mm, TP and AP	Propellant
Ammunition, 40mm, practice, M407A1, M382, and M385	Rockets, practice, 3.5-inch
Benite	Rocket motors, M3, M5, M6, M10, M13, M26, M30, M37, M42, M53, M66; Pershing 1st and 2nd stages; Spartan 1st, 2nd, and 3rd stages
Baron potassium nitrate	
GROUP D	
Adapter booster	Explosive D
Ammonium nitrate, except in original shipping container or equivalent	Explosives, cratering
Ammonium perchlorate, except when particle size is over 15 microns and in original shipping container or equivalent	Grenades, rifle, AT (except pentolite loaded)
Ammonium picrate (Explosive D)	HMX, wet
Bangalore torpedoes	Mine, APERS, MN, M14 (w/integral fuse)
Baratol	Mines, antipersonnel (bounding type
Black powder, bulk	Mines, antipersonnel (cast iron block)

Table 2 – Storage Compatibility Groups (Cont'd)

Bombs, demolition	Mines, HEAT Nitrocellulose wet 8-30% water exposed to detonation hazards at less than intra line distance
Bombs, fragmentation	Nitroguanidine
Bombs, general purpose	Nitrostarch Octol
Boosters	PBX
Boosters, auxiliary	pentolite
Bursters	PETN, wet
Charge, demolition, snake	Picratol
Charge, springing earth rod, blast driven	Picric acid
Charge, supplementary, HE	Projectiles, HE, fuzed or unfused
Compositions A, A-2, A-3, A-4, B, B-3, C, C-2, C-3, and C-4	RDX (Cyclonite), wet
Cutter, cable M1	Rocket heads, HE and HEAT (except pentolite loaded) w/o motors
Cyclonite (RDX), wet	Shaped charges
Cyclotol	Tetranitrocarbazole (TNC)
Demolition Blocks	Tetryl
Destructor, HE, M10	Tetrytol
Detonating cord (primacord) exposed to detonation hazard at less than intra line distance	TNT
Dynamite	Tritonal
Ednatol	Torpex

Table 2 – Storage Compatibility Groups (Cont'd)

GROUP E	
Ammunition, HEP	Ammunition, fixed and semifixed, 90mm through 106mm, loaded with ammonal, amatol, Explosive D, composition B or TNT
Ammunition, 20mm, HE, HEI and functional packs containing HE and HEI	Cartridge, heavy mortar, over 81mm (including 81mm M56), except chemical loaded
Ammunition, 30mm, HEDP	Cartridge, light mortar, 81mm or less (excluding 81mm M56), except chemical loaded
Ammunition, 37mm, HE	Redeye guided missiles, packaged 3 complete rounds w/launcher
Ammunition, 40mm, HE, RDX loaded	
Ammunition, 40mm, HE, M406, M386, M441, and M463	Rockets, HEAT, 3.5-inch, complete round
Ammunition, 57mm through 81mm, except WP smoke, HEP and blank	Rockets, HE, 2.75-inch (in LAU-3/A rocket launcher)
GROUP F	
Grenades, hand offensive	Grenades, fragmentation
GROUP G	
Ammunition, .50 caliber API and incendiary	Grenades, hand, CN1, ABC, M25A1, w/fuse C12
Ammunition, 20mm, API	Grenades, hand, CM1, ABC, M25A2, w/fuse C12
Ammunition, 20mm, incendiary and functional packs containing incendiary, except those containing HE or HEI	Grenades, illuminating and incendiary
Ammunition, 40mm, riot control and pyrotechnic loaded, except WP smoke	Grenades, practice, w/spotting charge
Bombs, photoflash	Grenades, rifle, smoke, XM48E1 and M22 and M23
Cartridge, igniter, M2	Grenades, smoke (except WP and PWP)
Cartridge, illuminating	Grenades, riot control, CS1, M25A2
Cartridge, photoflash	Igniter, spotting charge
Cartridge cases, primer (w/o propellant)	Igniters for rocket motors (e.g., M12, M18, M20 and M29)
Charge, igniter assembly, for practice hand grenades	Ignition cartridge for trench mortar ammunition
Charge, spotting, APR practice, M8	Illuminating compositions (consolidated in final press operations)
Chemical ammunition, Group B, tear or smoke producing, w/explosive components, over 40mm	Mines, practice, w/spotting charge and/or fuse
Chemical ammunition, Group B, tear or smoke producing, w/o explosive components	Nuclear fire marker device 11-F2

Table 2 – Storage Compatibility Groups (Cont'd)

Chemical ammunition, Group D, containing flammable solids, except for TEA or TPA, w/o explosive components	Photoflash powder
Chemical ammunition, Group D, fixed or semi-fixed rounds, containing flammable solids, except for TEA or TPA	Primers, artillery and cannon, percussion and electric
Clusters, incendiary bomb, M31 and M32 (w/o fuzing components)	Projectiles, illuminating
Destroyer, file, M4	Rocket, riot control agent, CS, 2.75-inch FFAR, MX99
Detonation, simulator, explosive M80	Simulators, M110, M115, M116, M117, M118, M119 and XM142
Grenade, hand, smoke, HC, M8	Smoke pots
Grenades, hand, CN, M7A1, w/fuse M201A1	Spotting charges (cartridge for miniature practice bombs)
Grenades, hand, CS, M7A3, w/fuse M210A1	
GROUP H	
Chemical ammunition, Group C	Grenade rifle, WP, M19
Grenades, WP	
GROUP J	
Chemical ammunition, Group D, containing flammable liquids or gels, with or w/o explosive components	Chemical ammunition, Group D, fixed and semifixed rounds, containing flammable liquids or gels with or without explosive components
GROUP K	
Chemical ammunition, Group A, with or without explosive components	Chemical ammunition, Group B, with or without explosive components, designed for toxic or incapacitating effects greater than lachrymation
Rockets, toxic chemical agents, complete rounds	

Table 2 – Storage Compatibility Groups (Cont'd)

GROUP L	
Aluminum powder	Fuzes, chemically-actuated, containing ampoules which may initiate directly or indirectly, explosives and explosives loaded components which are assembled in the conventional manner to form the finished explosive fuse
Ammonium nitrate	Magnesium powder
Ammonium perchlorate	Grenades, rifle, AT (pentolite loaded)
Ammunition, pentolite loaded	Nitrates (inorganic), except ammonium nitrate (in original shipping container or equivalent)
Chemical Ammunition, Group A, without explosive components	Perchlorates
Chemical ammunition, Group B, without explosive components, designed for toxic or incapacitating effects more severe than lachrymation	Peroxides, solid
Chemical ammunition, Group D, TEA or TPA components	Rocket heads, pentolite loaded, w/o motors
Chlorates	Zirconium (types I and II, spec. FED 1665)
DNT	
GROUP S	
Ammunition, 40mm, canister and multiple projectile	Fuse lighters
Ammunition, small arms, less than .50 caliber	Fuse safety
Explosive bellows	Squibs commercial
Firing devices	

Table 3 - Storage Compatibility Chart

Groups	A	B	C	D	E	F	G	H	J	K	L	N	S
A	X	Z											
B	Z	X	Z	Z	Z	Z	Z					X	X
C		Z	X	X	X	Z	Z					X	X
D		Z	X	X	X	Z	Z					X	X
E		Z	X	X	X	Z	Z					X	X
F		Z	Z	Z	Z	X	Z					Z	X
G		Z	Z	Z	Z	Z	X					Z	X
H								X					X
J									X				X
K										Z			
L													
N		X	X	X	X	Z	Z					X	X
S		X	X	X	X	X	X	X	X			X	X

Notes:

1. The marking "X" at the intersection of the above chart indicates that these groups may be combined in storage. Otherwise, mixing is either prohibited or restricted per Note 2 below.
2. The marking "Z" at an intersection of the above chart indicates that, when warranted by operational considerations or magazine non-availability, and when safety is not sacrificed, these groups may be combined in storage.
3. The marking "U" on the above chart indicates that leaking toxic chemical munitions of one agent type, i.e., GB, with or without explosive components, may be stored together in one magazine specifically designated for storage of leakers of that agent type.
4. Equal numbers of separately packaged components of complete rounds of any single type of ammunition may be stored together. When so stored, compatibility is that of the assembled rounds; i.e., WP Filler in Group H, HE Filler in Groups D, E, or F, as appropriate.
5. Group K required not only separate storage from other groups, but also requires that munitions having different toxic chemical agent fillers be stored separately from each other.
6. Ammunition designated "PRACTICE" by NSN and nomenclature may be stored with the fully loaded ammunition it simulates.

2.7 INVENTORY

Upon receipt and verification of explosive demolition material, the Magazine Data Card(s) is/are filled out and kept by the demolition team leader until after the demolition task and then returned to the SUXOS.

2.7.1 Usage Inventory

Following each occurrence of a receipt or issue of explosive material, the UXOQCS will conduct a joint inventory in conjunction with the demo team leader, verifying that the explosives received from the distributor were used and that none remain. If there are any demolition material remaining after the demolition operation then the material will be inventoried and returned to the distributor the same day.

2.7.2 Discrepancies

In the event there is a discrepancy during any inventory, the item will be recounted a minimum of two additional times. If a discrepancy still exists, the site manager, Parsons PM, USAESCH PM, USAESCH Contracting Officer, and BATF will be telephonically notified and a written report will be submitted within 24 hours of the discovery.

2.7.3 Procedures for Return to Distributor of Explosives not Expended

Explosives that were delivered and issued for use but were not expended will be returned daily to the distributor at the completion of disposal operations. The Demolition Team Leader will secure the unused explosives in an IME 22 type storage container awaiting arrival of the distributor and complete the Explosives Use Record (Figure 4).

Figure 4 – Explosives Usage Record

Explosive Usage Record

Team Number: Date: **Project**

Team Leader: **Work Areas & Grid Numbers:**

Explosives Issued — Signature of Team Leader:

Item	Quantity	Lot Number	Checkers Initials

Explosives Expended — Signature of Team Leader

Item	Quantity	Lot Number	Checkers Initials

Explosives Returned — Signature of SUXOS:

Item	Quantity	Lot Number	Checkers Initials

The signatures in each section of this document indicate that the items listed in that section were in fact issued, expended, or returned to storage and that the quantities listed were verified through a physical count.

2.8 TRANSPORTATION

Transportation of MEC will comply with all Federal, state, and local regulations. Permits are not required under CERCLA for on-site or on Federal installation transportation of demolition material or MEC. Off-site transportation of demolition material or MEC will not be necessary.

2.8.1 General Highway Transport

In most instances, the following data presented is sufficient to meet the requirements for explosive transport.

2.8.2 Commercial Motor Vehicle Requirements (49CFR Part 383.5)

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

- Has a gross combination weight rating of 11,794 or more kilograms (26,001 pounds or more), inclusive with a towed unit with a gross vehicle weight rating of more than 4,536 kilograms (10,000 pounds); or
- Has a gross vehicle weight rating of 11,794 or more kilograms (266,001 pounds or more); or
- Is designed to transport 16 or more passengers, including the driver; or
- Is of any size and is used in the transportation of materials found to be hazardous for the purposes of the *Hazardous Materials Transportation Act*, and which require the motor vehicle to be placarded under the *Hazardous Materials Regulations (49 CFR part 172, subpart E).*

2.8.3 CDL Requirements

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

2.8.4 Federal Installations/On-Site

Transportation of demolition material and MEC on-site and on Federal installations will comply with the following:

- Vehicles will be inspected per occurrence and will be properly placarded;
- Explosives will be transported in closed vehicles whenever possible. When using an open vehicle, explosives will be covered with a flame resistant tarpaulin (except when loading/unloading);

- Vehicle engine will not be running. Wheel chocks and brakes set when loading/unloading explosives;
- Beds of vehicles will have either a plastic bed liner, dunnage, or sandbags to protect the explosives from contact with the metal bed and fittings;
- Vehicles transporting explosives will have a first aid kit, two 10 ABC rated fire extinguishers, and communications capabilities;
- Initiating explosives, such as detonators, will remain separated from other high explosives during loading, unloading, and while on vehicles;
- Compatibility requirements will be observed;
- Operators transporting explosives will have a valid drivers license; and
- Drivers will comply with posted speed limits, but will not exceed a safe and reasonable speed for conditions. Vehicles transporting explosives off-road will not exceed 25 mph.

2.8.5 Off-Site Transportation of Explosives over Public Highway

2.8.5.1 DOT Certificate of Registration

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

2.8.5.2 Mixed Packaging Requirements

Explosives of compatibility Group S may be packed with explosives of all other explosive compatibility groups except A and L. To determine the compatibility of the materials typically transported by site personnel, check the Material Data Sheets presented in Attachment 1.

2.8.6 General Placard Requirements

Those munitions response sites that require placards will accomplish this IAW 49 CFR 172.504. The placard requirements listed below will apply to explosives transportation, if applicable:

"(a) Except as otherwise provided, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 4 and 5, in accordance with other requirements and exceptions."

"(c) Exceptions for less than 454 kg (1,001 pounds). Except for bulk packaging and hazardous materials subject to § 172.505, when hazardous materials covered by Table 5 of this section are transported by highway or rail, placards are not required on:

(1) A transport vehicle or freight container which contains less than 454 kg (1,001 lbs.) aggregate gross weight of hazardous materials covered by Table 5 of paragraph (e) of this section; or

(2) A rail car loaded with transport vehicles or freight containers, none of which is required to be placarded."

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

Table 4: General Placard Requirements

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard Design Section Ref. (§)
1.1	Explosives 1.1	172.523
1.2	Explosives 1.2	172.524
1.3	Explosives 1.3	172.525
2.3	Poison Gas	172.532
4.3	Dangerous When Wet	172.528
6.1 PG I, inhalation hazard only)	Poison	172.542
7 (Radioactive Yellow III label only)	Radioactive	172.544

Table 5: General Placard Requirements

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard Design Section Ref. (§)
1.4	Explosives 1.4	172.523
1.5	Explosives 1.5	172.524
1.6	Explosives 1.6	172.525
2.1	Flammable Gas	172.532
2.2	Non-Flammable Gas	172.528
3	Flammable	172.542
Combustible liquid	Combustible	172.544
4.1	Flammable Solid	172.546
4.2	Spontaneously Combustible	172.547
5.1	Oxidizer	172.550
5.2 (Other than organic peroxide, Type B, liquid or solid, temperature controlled).	Organic peroxide	172.552
6.1 (PG I or II, other than Zone A or B inhalation hazard).	Poison	172.554
6.1 (PG III)	Keep Away from Food	172.553
6.2	(None)	
8	Corrosive	172.558
9	Class 9	172.560
ORM-D	(None)	

2.8.7 Documentation

Any time demolition material or MEC are being transported, this chapter to include the completed copies of documents described below will be in the vehicle.

- Instructions for Motor Vehicle owners (Emergency Response Information) - Figure 6.
    - Only those items, which are being transported, will be entered in the form with the applicable qty/units and weight columns completed. It is imperative that the NEW limitations of 55 lbs not be exceeded. All required data will be entered on the front and the Guide 50 block should be checked on the back of the form.
- Explosives Purchase/Receipt/Transport Authorization List - Figure 1
    - The form will be completed ensuring the pertinent data for all those transporting explosives is included on the form. As with the other required forms, this one will be part of the transport paperwork. Only the route shown will be used unless there is an emergency or the route is blocked.
    - Any deviation from the planned route will be reported to and coordinated with the UXOSO.
- Explosive Vehicle Inspection Checklist - Figure 7.
    - The form is to be completed prior to placing any explosives in the vehicle and will accompany the shipment.
- BATF Permit/License.
    - A copy of the current BATF license will accompany the vehicle and be readily available.

Figure 6 – Emergency Response Information

SHIPPING PAPER AND EMERGENCY RESPONSE INFORMATION FOR HAZARDOUS MATERIALS					
THIS VEHICLE IS TRANSPORTING HAZARDOUS MATERIALS					
Date Prepared:	Date of Travel:			Page_____of_____	
Proper Shipping Name	**Hazard**	**ID No.**	**PG**	**Qty/Units**	**Weight**
Emergency notification. In all cases of accident, incident, breakdown or fire, prompt notification must be given. **FOR EMERGENCY RESPONSE INFORMATION, SEE BACK OF THIS FORM**					
Remarks:					
Certification: This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.					
Signature of Shipper Representative:	Signature of Vehicle Operator(s):				
24-Hour Emergency Assistance Telephone Numbers:	Work Hours Emergency Phone Numbers:				

Figure 6 – Emergency Response Information (Cont'd)

EMERGENCY RESPONSE INFORMATION

Guide Number 46 and 50 from the U.S. Department of Transportation Emergency Response Guide Book P 5800.6 are reproduced hereon. These guides are applicable to Hazard Class 1 Materials (Explosives).
Mark an X in the appropriate box:

☐ **USE GUIDE 46 FOR EXPLOSIVES (1.1), (1.2), (1.3), (1.5), AND (1.6)**

☐ **USE GUIDE 50 FOR EXPLOSIVES (1.4)**

For all other hazardous materials or substances, annotate appropriate Emergency Response Guide Book Guide Number in the block below, and attach a copy of the guide number page or pages.

Guide Numbers:

GUIDE 46 (ERG 93)

POTENTIAL HAZARDS
FIRE OR EXPLOSION:
May explode and throw fragments 1 mile or more if fire reaches cargo.
HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION
If fire reaches cargo, do not fight fire.

If you know or suspect that heavily-encased explosives, such as bombs or artillery projectiles are involved, stop all traffic and begin to evacuate all persons, including emergency responders, from the area in all directions for 5000 feet (1 mile) for rail car or 4000 feet (3/4 mile) for tractor/trailer.

When heavily-encased explosives are not involved, evacuate the area for 2500 feet (½ mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE
Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use Halon, dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK
Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch or walk through spilled material.

FIRST AID
Call emergency medical care.
Use first aid treatment according to the nature of the injury.

GUIDE 50 (ERG 93)

POTENTIAL HAZARDS
FIRE OR EXPLOSION:
May explode and throw fragments 1/3 mile or more if fire reaches cargo.
HEALTH HAZARDS:
Fire May produce irritating or poisonous gases.

EMERGENCY ACTION
If fire reaches cargo, do not fight fire.

Stop all traffic and begin to evacuate all persons, including emergency responders, from the area for 1500 feet (1/3 mile) in all directions.

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide limited protection.

CALL Emergency Response Telephone Number on Shipping paper FIRST. If Shipping Paper NOT AVAILABLE or NO ANSWER, CALL CHEMTREC AT 1-800-424-9300.

FIRE
Cargo Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO. Withdraw from area and let fire burn.

Truck and Equipment Fires: Try to prevent fire from reaching the explosive cargo compartment. Flood with water; if no water is available use Halon, dry chemical or earth.

Promptly isolate the scene by removing ALL PERSONS from the vicinity of the incident if there is a fire. First, move people out of line-of-sight of the scene and away from windows. Then, obtain more information and specific guidance from competent authorities listed on the shipping papers.

SPILL OR LEAK
Shut off ignition sources; no flares, smoking or flames in hazard area. Do not touch or walk through spilled material.

FIRST AID
Call emergency medical care.
Use first aid treatment according to the nature of the injury.

SUPPLEMENTAL INFORMATION
Packages bearing the 1.4S label contain explosive substances or articles that are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments; effects are usually confined to immediate vicinity of packages.

If fire threatens cargo area containing packages bearing the 1.4S label, consider initial isolation of at least 50 feet in all directions. Fight fire with normal precaution from a reasonable distance.

2.9 FIRE PROTECTION PLAN

2.9.1 Explosive Vehicle Carrier

9.1.1 In the event of a fire at or near a vehicle containing explosives, all site personnel will be evacuated to a distance outside the NEW for Inhibited Building Distance (IBD), as stated in Chapter 4, of the approved Site Work Plan. An honest attempt to fight the fire will be made with all available fire-fighting equipment on hand. A reasonable decision will be made by the UXOSO when these means have been exhausted and any further attempts will endanger site personnel. At no time will anyone attempt to evacuate the explosives from the vehicle unless the fire is in the front of the vehicle and not near the bed.

9.1.2 The UXOSO will meet the responding local fire department and brief them on the following –

- Total Quantity of Explosives, by hazard classification, inside the vehicle
- Time the fire started
- The amount of time the vehicle have been engulfed by flames

2.9.2 General Housekeeping

Periodic housekeeping (bi-weekly or as needed) will be conducted in the vehicle bed and cab. All trash will be removed from the vehicle and any spilled liquids cleaned up.

Figure 7 - Explosive Vehicle Inspection Form

EXPLOSIVE VEHICLE INSPECTION FORM			
This form must be filled out for any vehicle carrying explosives, prior to loading.			
DRIVERS NAME		LICENSE NUMBER	
COMPANY			
TYPE OF VEHICLE		VEHICLE NUMBER	
INSPECTION DATE/TIME		INSPECTOR	
PART INSPECTED	**SAT.**	**UNSAT.**	**COMMENT**
HORN			
STEERING SYSTEM			
WIPERS			
MIRRORS			
FIRE EXTINGUISHERS (10 ABC, 2 EACH)			
REFLECTORS			
EMERGENCY FLASHERS			
LIGHTS			
ELECTRIC WIRING			
FUEL SYSTEM			
EXHAUST SYSTEM			
BRAKE SYSTEM			
SUSPENSION			
CARGO SPACE			
TIRES, WHEELS, RIMS			
TAILGATE			
TARPAULIN			
INSPECTION RESULTS (INSPECTOR INITIAL)			
ACCEPTED:			
REJECTED:			
REMARKS			
DRIVERS SIGNATURE/DATE			INSPECTORS SIGNATURE/DATE

Attachment 1

Material Data Sheets

CORD DETONATING (1.4D) (UN0289)

New Explosive Weight (New)

FORMULA: .00229 OZ = 1 Grain
80 gr. X .00229 = .1832 oz.
.1832 oz. Per ft. x 100' = 18.32 oz. Total Net Explosive Weight / 100 feet

HAZARDOUS CLASS OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:
CORD DETONATING, FLEXIBLE UN0289 1.4D

CFR 49 172.101 TABLE OF HAZMAT MATERIAL
CORD DETONATING, FLEXIBLE UN0289 1.4D

CFR 49 173.63 (a)

Packaging Exceptions

(a) Cord, Detonating (UN0065), having an explosive content not exceeding 6.5g (0.23 ounces) per 30 centimeter length (one linear foot) may be offered for transportation domestically and transported as Cord, detonating (UN0289), Division 1.4 Compatibility Group D (1.4D) explosives, if the gross weight of all packages containing Cord, detonating (UN0065), does not exceed 45 kg (99 pounds) per:

(1) Transport vehicle, freight container, or cargo-only aircraft;

UN0065 and UN0289 Use Packaging Instruction #139
Research and Special Programs Administration, DOT § 173.62

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
139 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord must be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of CORD DETONATING flexible must be fastened securely. 2. For UN 0065 and UN 0289, inner Packagings are not required when they are fastened securely in coils.	Bags ..... Plastics Receptacles ..... Fiberboard Metal Plastics Wood Reels ..... Sheets ..... Paper Plastics	Not necessary	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Plywood (1D). Fibre (1G). Plastics, removable head (1H2).

SHAPE CHARGE (1.4S) (UN0441)

HAZARDOUS CLASS OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

CHARGES, SHAPED, COMMERCIAL W/O DETONATOR UN0441 1.4S

CFR 49 172.101 TABLE OF HAZMAT MATERIAL

CHARGERS, SHAPED, COMMERCIAL WITHOUT DETONATOR UN0441 1.4S

CFR 49 173.62

Packaging & Instructions #137

49 CFR ch. 1 (10-97 Edition) § 173.62

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
137 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0059, 0439, 0440, and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked "This Side Up". When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation. 2. For UN 0065 and UN 0289, inner Packagings are not required when they are fastened securely in coils.	Bags ..... Plastics Boxes ..... Fiberboard Tubes ..... Fiberboard Metal Plastics Dividing partitions in the outer Packagings.	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G).

DETONATOR, NON-ELECTRIC (1.4B) (UN0267)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name

DETONATOR, NON-ELECTRIC UN0267 1.4B

CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

DETONATOR, NON-ELECTRIC UN0267 1.4B

Special Provisions (column #7)

#103 Detonators which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to 1.4B classification code. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously.

CFR 49 173.63 (g)

Packaging Exceptions

(g) Detonators that are classed as 1.4B or 1.4S and contain no more than 1 g of explosive (excluding ignition and delay charges) may be packed as follows in which case they are excepted from the packaging requirements of § 173.62:

(1) No more than 50 detonators in one inner packaging;

(2) IME Standard 22 container is used as the outer packaging;

(3) No more than 1000 detonators in one outer packaging; and

(4) Each inner packaging is marked "1.4B Detonators" or "1.4S Detonators", as appropriate.

DETONATOR, ELECTRIC (1.4B) (UN0244)

HAZARDOUS CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name

DETONATOR, ELECTRIC UNO244 1.4B

CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

DETONATOR, ELECTRIC UN0255 1.4B

Special Provisions (column #7)

#103 Detonators which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to 1.4B classification code. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one detonator near the center of a shipping package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and all additional detonators in the outside packaging that explode may not exceed 25 grams.

CFR 49 173.63 (f) & (g)

Packaging exceptions:

(f) Detonators containing no more than 1g explosive (excluding ignition and deadly charges) that are electric blasting caps with leg wires four feet long or longer, delay connectors in plastic sheaths, or blasting caps with empty plastic tubing twelve feet long or longer, may be packed as follows, in which case they are excepted from the packaging requirements of § 173.62:

(1) No more than 50 detonators in one inner packaging;
(2) IME Standard 22 container or compartment is used as the outer packaging;
(3) No more than 1,000 detonators in one outer packaging; and
(4) No material may be loaded on top of the IME Standard 22 container and no material may be loaded against the outside door of the IME standard 22 compartment.

(g) Detonators that are classed as 1.4B or 1.4S and contain no more than 1g of explosive (excluding) ignition and delay charges) may be packed as follows in which case they are excepted from the packaging requirements of § 173.62:

(1) No more than 50 detonators in one inner packaging;
(2) IME Standard 22 container is used as the outer packaging;
(3) No more than 1,000 detonators in one outer packaging; and
(4) Each inner packaging is marked "1.4B Detonators" or "1.4S Detonators", as appropriate.

CFR 49 173.62 SPECIAL PACKING REQUIREMENTS FOR EXPLOSIVES
(Explosives Table) UN0267 PI# 131

Research and Special Programs Administration, DOT § 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
131 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0029, 0267, and 0455, bags and reels may not be used as inner packagings. 2. For UN 0030, 0255, and 0455, inner packagings are not required when detonators are packed in pasteboard tubes, or when their leg wires are wound on spools with the caps either placed inside the spool or securely taped to the wire on the spool, so as to restrict freedom of movement of the caps and to protect them from impact forces. 3. For UN 0360, 0361, and 0500, detonators are not required to be attached to the safety fuse, metal-clad mild detonating cord, detonating cord, or shock tube, inner packagings are not required if the packing configuration restricts freedom of movement of the caps and protects them from impact forces.	Bags ..... Paper Plastics Receptacles ..... Fiberboard Metal Plastics Wood Reels	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fibre (1G). Plastics, removable head (1H2).

CFR 49 173.63 PA PACKAGING EXCEPTIONS (Enclosure 1)
(g) (2) IME Standard 22 container
Publication: Institute of Makers of Explosives SLP #22 May 1993
Publication: Guide for the Use of the IME 22 Container Oct. 1, 1993

IGNITER, M2/M60 F/TIME BLASTING FUSE (1.4S) (UN0131)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:
LIGHTERS, FUSE 1.4S UN0131

CFR 172.101 TABLE OF HAZARDOUS MATERIALS

LIGHTER, FUSE 1.4S UN0131

CFR 173.62

Packaging Instruction #142

49 CFR ch. 1 (10-97 Edition) § 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
142	Bags ..... Paper Plastics Receptacles ..... Fiberboard Metal Plastics Wood Sheets ..... Paper Trays, fitted with dividing partitions plastics	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fibre (1G). Plastics, removable head (1H2).

FUSE, BLASTING TIME M700 (1.4S) (UN0105)

HAZARD CLASSIFICATION OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

FUSE, SAFETY UN0105 1.4S

CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

FUSE, SAFETY UN0105 1.4S

CFR 49 173.62

Packing Instructions #140

Research and Special Programs Administration, DOT § 173.62

Table of Packing Methods - Continued

Packing Instruction	Inner Packagings	Intermediate Packagings	Outer Packagings
140 ..... PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. If the ends of UN 0104 are sealed, no inner packagings are required. 2. For UN 0101, the packaging must be sift-proof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps. 3. For UN 0101, steel or aluminum boxes or drums must not be used.	Bags ..... Plastics Reels ..... Sheets ..... Paper, kraft Plastics	Not necessary ...	Boxes. Steel (4A). Aluminum (4B). Wood, natural, ordinary (4C1). Wood, natural, sift proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fibreboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fibre (1G).

Attachment 2

Motor Vehicle Inspection
DoD Form 626

MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)

(Read Instructions before completing this form.)

This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.

1. BILL OF LADING/TRANSPORTATION CONTROL NUMBER

SECTION 1 - DOCUMENTATION	ORIGIN a.	DESTINATION b.
2. CARRIER/GOVERNMENT ORGANIZATION		
3. DATE/TIME OF INSPECTION		
4. LOCATION OF INSPECTION		

5. OPERATOR(S) NAME(S)	
6. OPERATOR(S) LICENSE NUMBER(S)	
7. MEDICAL EXAMINER'S CERTIFICATE*	

9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT* — YES / NO

8. *(X if satisfactory at origin)*

a. MILITARY HAZMAT ENDORSEMENT		d. ERG OR EQUIVALENT COMMERCIAL:	YES / NO
b. VALID LEASE*		e. DRIVER'S VEHICLE INSPECTION REPORT*	
a. TRUCK/TRACTOR		c. ROUTE PLAN	
b. TRAILER		f. COPY OF 49 CFR PART 397	

*sterisk shall be checked on all incoming loaded equipment.

EHICLE NUMBER(S)

10. TYPE OF VEHICLE(S)

11. V

SECTION II - MECHANICAL INSPECTION

All items shall be checked on empty equipment prior to loading. Items with an a

12. PART INSPECTED *(X as applicable)*	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
k. EXHAUST SYSTEM					
l. BRAKE SYSTEM*					
m. SUSPENSION					
n. COUPLING DEVICES					
o. CARGO SPACE					
p. LANDING GEAR*					
q. TIRES, WHEELS, RIMS					
r. TAILGATE/DOORS*					
s. TARPAULIN*					
t. OTHER *(Specify)*					

(X as applicable)	SAT	UNSAT	SAT	UNSAT
a. SPARE ELECTRICAL FUSES				
b. HORN OPERATIVE				
c. STEERING SYSTEM				
d. WINDSHIELD/WIPERS				
e. MIRRORS				
f. WARNING EQUIPMENT				
g. FIRE EXTINGUISHER*				
h. ELECTRICAL WIRING				
i. LIGHTS AND REFLECTORS				
j. FUEL SYSTEM*				

e) ACCEPTED ☐ REJECTED ☐

13. INSPECTION RESULTS *(X or*

Remarks". Equipment will be approved if deficiencies are corrected prior to loading.) *(If rejected give reason under "*

LANCE SYSTEM: *(X one)* ACCEPTED REJECTED 14. SATELLITE MOTOR SURVEIL

RKS 15. REMA

CTOR SIGNATURE *(Origin)* 17. INSPECTOR SIGNATURE *(Destination)* 16. INSPE

SECTION III - POST LOADING INSPECTION

This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.

	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR					
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT					
20. SEALS APPLIED TO CLOSED VEHICLE; TARPAULIN APPLIED ON OPEN EQUIPMENT					

	SAT	UNSAT	SAT	UNSAT
21. PROPER PLACARDS APPLIED				
22. SHIPPING PAPERS/DD FORM 836 FOR GOVERNMENT VEHICLE SHIPMENTS				
23. COPY OF DD FORM 626 FOR DRIVER				
24. SHIPPED UNDER DOT SPECIAL PERMIT 868				

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (*) apply to commercial operators or equipment only. Only Items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW 49 CFR 383.

Item 7. *Enter the expiration date listed on the Medical Examiner's Certificate.

[redacted]

Item 8.a. APPLIES TO MILITARY OPERATORS ONLY. Military Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract or lease is carried in all leased vehicles and is available for inspection. (49 CFR 376.12 and 376.11(c)(2)).

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. *Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

[redacted]

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Transportation of Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper will provide a copy to operator.

Item 9. *Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection and perform DD Form 626 inspection.

SECTION II - MECHANICAL INSPECTION

General Instructions.

All items (12.a. through 12.t.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (*) shall be checked on all incoming loaded equipment

SECTION II *(Continued)*

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the

[redacted]

requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with serviceable fire extinguishers with an Underwriters Laboratories ra of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher(s must be located so that it is readily accessible for use and securel mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whet it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and prop secured. Insulation must not be frayed, cracked or otherwise in pc condition. There shall be no uninsulated wires, improper splices c connections. Wires and electrical fixtures inside the cargo area m be protected from the lading. (49 CFR 393.28, 393.32, 393.33)

INSTRUCTIONS

SECTION II *(Continued)*

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393.24, 25, and 26)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83)

l. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 393.40, 41, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, and 55)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 393.207)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFR 393.70 and 71)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 393.84)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled

SECTION II *(Continued)*

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 393.75)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. The DTTS Message Display Unit, when operative, will display the signal "DTTS ON". The munitions carrier driver, when practical, will position the DTTS message display unit in a manner that allows the shipping inspector or other designated shipping personnel to observe the "DTTS ON" message without climbing aboard the cab of the motor vehicle.

SECTION III - POST LOADING INSPECTION

General Instructions.

All items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipı fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR 172.504.

Item 22. Check to ensure operator has been provided shipping pape that comply with 49 CFR 172.201 and 202. For shipments transporte Government vehicle, shipping paper will be DD Form 836.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy an understand the hazards associated with the shipment.

Item 24. Applies to Commercial Shipments Only. If shipment is mac under DOT Special Permit 868, ensure that shipping papers are proc annotated and copy of Special Permit 868 is with shipping papers.

STANDARD OPERATING PROCEDURE
NUMBER 3

WHITE PHOSPHORUS

SOP 3 - WHITE PHOSPHORUS

3.1 INTRODUCTION

This SOP is designed to ensure that every possible precaution is taken to prevent accidents involving the handling and destruction of white phosphorus (WP). It is meant to be used as a supplement to the approved Parsons demolition SOP, TM 60A-1-1-22, EM 385-1-97 and other applicable publications.

3.2 OPERATIONS

3.2.1 Personal Protective Equipment (PPE)

Once WP has been positively identified it will not be moved if fuzed IAW EM 385-1-97, however if not fuzed it may be safely relocated if the individual is wearing nomex gauntlet type gloves and welders or nomex apron, and a face shield.

3.2.2 WP Precautions

If WP is suspected to be present, the UXO teams will either have buckets/containers of loose sand, mud, water, oil, dirt or some other smothering agent in the event that when recovering a WP round it commences smoking. The bucket/container should be large enough so that when the item is placed in the bucket/container it is completely submerged/covered. If, when moving the round, it starts to smoke it may not be picked up and placed in the bucket but the contents of the bucket may be poured on the item and the team retreats from the site and awaits a minimum of 30 minutes prior to reentering the area.

3.2.3 WP Demolition Operations

As stipulated in TM60 Series publications, all known and suspected WP rounds will be destroyed by blowing the round into the air from underneath. This will be accomplished by placing a demolition charge at a one-to-one ratio underneath the item to be destroyed i.e., if there is one pound of WP to be destroyed there will be a minimum of one pound of demolition material used. This rule is a guide and is not intended to require individuals to cut or needlessly break boosters in order to achieve the ratio. It is better to use more than less. At no time will more than five (5) pounds of WP i.e., full up 81mm, M57, be destroyed in any one shot. In most cases shots will not be more than two (2) pounds of WP, i.e., tail section of 81mm, M57. The area around the demo site will be cleared of vegetation if possible and wetted down, local authorities notified and the team properly equipped and placed in the most advantageous upwind positions to respond in the event of a fire.

3.3 AVOIDANCE

In an effort to further reduce the possibility of a fire involving WP, the following steps will be taken:

- If possible, avoid conducting clearance/removal activities in known WP contaminated areas during the dry season.
- If a WP munition is encountered in the morning, immediately conduct demolition operations while the grass is still wet and the winds are light.
- If necessary, construct a containment barricade that will contain the shot after which the team will remove the barricade and carefully expose the pieces of WP that were not consumed to the air, ensuring they are completely consumed.
- If possible move those items, that are acceptable to move to a more suitable, i.e., to a less combustible area for demolition.
- Either have the local fire department provide fire fighting equipment and personnel on site or construct a pick-up truck towed trailer containing a multi-gallon container and gasoline-operated pump with hose to assist in fighting a fire.

STANDARD OPERATING PROCEDURE
NUMBER 4

PERSONAL PROTECTIVE EQUIPMENT

SOP 4 - PERSONAL PROTECTIVE EQUIPMENT

4.1 INTRODUCTION

4.1.1 This personal protective equipment (PPE) plan specifies procedures to protect personnel from safety and health hazards when performing field operations at the site. This plan addresses U.S. Army Corps of Engineers PPE requirements contained in Section 5 of the USACE Safety and Health Requirements Manual (EM 385-1-1, 15 Sep 2008) and the Occupational Safety and Health Administration (OSHA) requirements as specified in 29 CFR 1910.132 (Personal Protective Equipment).

4.1.2 The purpose of PPE is to shield, isolate, or secure individuals from hazards that may be encountered when administrative or engineering controls are not feasible or cannot provide adequate protection.

4.1.3 The selection of the appropriate PPE is a complex process that takes into consideration a variety of factors. Key factors involved in this process are the identification of suspected hazards; their routes of exposure (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials in providing a barrier to these hazards. The anticipated levels of protection are outlined below. Compliance with the PPE selection requirements will be enforced by the SSHO.

4.2 PROTECTIVE ENSEMBLES

Descriptions of the PPE ensembles and project-specific applications are provided in the Work Plan.

4.3 DONNING AND DOFFING OF PPE

4.3.1 Donning of PPE will be accomplished in accordance with the manufacturer's instructions and only after an inspection of the item to ensure its operability, continuity and to be certain there are no "critters" making a home of the item. This inspection should include peering into and the shaking and slapping together of leather gloves prior to putting them on. The same procedure goes for the work boots and head protection. Be certain to conduct a visual inspection and then shake and bang the items against a hard object to dislodge any would be intruders.

4.3.2 Doffing of PPE is accomplished in accordance with the manufacturer's instructions and includes a complete inspection to ensure the item is free of dirt or anything else that may be clinging to it as well as an inspection for operability and continuity. Any item found to be torn, or inoperable must be replaced and the defective item either properly disposed of or repaired.

4.4 MAINTENANCE AND STORAGE OF PPE

4.4.1 Maintenance of PPE will only be conducted in accordance with the manufacturer's instructions and, in the instance of Level A and B PPE, only by personnel that have received proper instruction in the maintenance of the PPE. Replacement items or parts will be those provided by the manufacturer and at no time will pieces from different brands of PPE be used to "fix" a defective piece of PPE. Any PPE used inside an Exclusion Zone (EZ), which is contaminated with HTRW or CWM shall be cleaned in accordance with the documented decontamination procedures. This cleaning will involve the use of one or more decontamination solutions and a fresh water rinse, and all re-usable PPE should be dried, or hung to dry, and stored in a clean environment, free from exposure to chemicals, dust, moisture, sunlight or extreme temperatures. Level D PPE, such as leather gloves, hard hats and safety glasses will be cleaned of dirt or anything clinging to the items that should not be there after every use.

4.4.2 PPE must be stored properly to prevent damage or malfunction due to exposure to dust, moisture, sunlight, damaging chemicals, extreme temperatures, and impact. Many equipment failures can be directly attributed to improper storage. Storage of PPE will include storing in such a way that the natural shape of the PPE is not compromised. All PPE must be stored in such as manner as to prevent "critters" from crawling into the item and presenting a possible injury from a bite or sting. Establish a location and procedure for the proper storage of PPE. The bed of the pick-up truck or floor of the SUV is not acceptable locations for the storage of PPE.

4.4.3 Different types of clothing and gloves should be stored separately to prevent issuing the wrong material by mistake. Protective clothing should be folded or hung in accordance with manufacturer's recommendations.

4.4.4 Reusable clothing (outer gloves, boots) must be thoroughly decontaminated before being reused.

4.5 TRAINING AND PROPER FITTING

The SSHO or other qualified person will train Parsons Employees and subcontractors in the proper use of protective equipment prior to field operations. At a minimum, the training should explain the user's responsibilities and should address the following issues, using a combination of classroom lecture and field simulation:

- OSHA and USACE PPE requirements;
- Proper use and maintenance of the selected PPE, including capabilities and limitations;
- Nature of the hazards and the consequences of not using the PPE;
- Instruction inspection, donning, doffing, decontaminating, checking, fitting, and using the selected PPE;
- User's responsibility (if any) for decontamination, cleaning, maintenance, and repair of PPE; and

- Emergency procedures and self-rescue in the event of PPE failure.

4.6 PPE PROGRAM EVALUATION

At a minimum, the PPE program should be reviewed monthly by the SSHO to evaluate the effectiveness of the following factors:

- Number of personnel-hours that are spent in various PPE ensembles;
- Degree to which the program complies with OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) and USACE requirements on PPE use, inspection, maintenance, and recordkeeping;
- Accident, injury, and illness statistics, and recorded levels of exposure;
- Aadequacy of operating procedures to guide the selection of PPE; and
- Recommendations for and results of program improvement and modification.

STANDARD OPERATING PROCEDURE
NUMBER 5

HEARING CONSERVATION PROGRAM

SOP 5 - HEARING CONSERVATION PROGRAM

5.1 INTRODUCTION

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

5.2 AUDIOMETRIC TESTING PROGRAM

5.2.1 Audiometric testing shall be made available to all employees whose exposures equal or exceed an 8-hour time - weighted average of 85 decibels or equivalently a dose of 50 percent Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or physician who is certified by the Council of Accreditation in Occupational Hearing Conservation. Each employee assigned to noisy operations must receive a baseline audiogram prior to assignment and yearly testing thereafter for as long as that employee is exposed to excessive noise levels (8-hour time-weighted average of 85 decibels or greater). Each employee's annual audiogram is compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. (A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2,000, 3,000, and 4,000 Hz in either ear.) This comparison should be done by a physician.

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

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

5.2.3 Audiometric tests shall be pure tone, air conduction, and hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.

Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers. The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Audiometer calibration shall be checked acoustically at least annually in accordance with OSHA requirement (29 CFR 1910.95 Appendix E)

5.3 HEARING PROTECTORS

The SSHO shall make hearing protectors available to all Parsons and subcontract employees exposed to an 8-hour time-weighted average of 85 decibels or equivalently a dose of 50 percent. Hearing protection for this project will consist of earmuffs or foam fitting earplugs. The selection of hearing protector will be based upon noise attenuation requirements for the task and worker comfort.

5.4 EMPLOYEE TRAINING

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

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

5.5 NOISE MONITORING

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

- Verify that appropriate hearing protection is being used by employees
- Identify the boundaries of the noise hazard area in accordance with Section 05.C.08 of EM 385-1-1.

5.5.2 Noise level monitoring instruments used to measure employee noise exposure shall be calibrated to ensure accuracy.

STANDARD OPERATING PROCEDURE
NUMBER 6

LOCKOUT / TAGOUT PROGRAM

SOP 6 - LOCKOUT/TAGOUT PROGRAM

6.1 INTRODUCTION

6.1.1 Objective

This procedure shall be used by Parsons and subcontractor personnel to ensure that the machine or equipment being worked on is isolated from all potential hazardous energy sources, and locked out or tagged out before an employee performs any servicing or maintenance activity where the unexpected energization, start-up, or release of energy could cause an injury. Energy sources can be electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

6.1.2 Purpose

This procedure establishes the minimum safety requirements to ensure the proper deactivation of movable, electrically energized, pressurized equipment and systems; and systems containing hazardous materials prior to repairing, cleaning, oiling, adjusting, or similar work. This procedure complies with the requirements in 29 CFR 1910.147.

6.1.3 Requirements

This procedure applies to all equipment that receives energy from electrical power, hydraulic fluid under pressure, compressed air, steam, energy stored in springs, potential energy from suspended parts, or any other source that may cause unexpected movement when it is necessary to perform work on that system. It also applies to similar functions performed on systems containing hazardous materials.

6.1.4 Definitions

- **Lockout** - The placement of a lockout device on an energy isolating device, in accordance with this procedure, is ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed. The lockout device can be key operated or a combination device.
- **Tagout** - The placement of a tagout device on an energy isolating device, in accordance with this procedures, is to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed by the authorized person who originally placed the tagout device in position.
- **Authorized employee** - A person who locks or implements a tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment.

6.2 LOCKOUT/TAGOUT STEPS

Prior to initiating any repairs, modifications, and/or adjustments to operating equipment, these steps will be followed:

1. The immediate supervisor with jurisdiction over the equipment and all affected employees will be notified that the energy sources are to be deactivated.
2. All sources of power that must be locked out, blocked, or released will be identified by the immediate Supervisor and the employee who will work on the equipment.
3. In order to ensure that the equipment cannot be re-energized while maintenance activities are performed, the employee will lockout/blank out all potential energy sources. (Employees will be assigned padlocks with their names or identification numbers affixed to the locks. The locks will be individually keyed to prevent another employee from removing the lock inadvertently.) If more than one employee is assigned to work on the equipment, a multi-lockout hasp will be used so that all employees working on the equipment can apply their locks and ensure their safety.
4. A tagout device will be affixed to all components or systems de-energized to indicate that lockout has been performed.
5. After the servicing and/or maintenance is complete and the equipment is ready for normal operations, check the area around the machine or equipment. After all tools have been removed from the machine or equipment, guards have been reinstalled, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

6.3 SPECIAL CONDITIONS

6.3.1 During certain operations it may be necessary to energize the equipment for a short period of time. Employees in the immediate area will be notified and directed to stay clear of the equipment. If the equipment is to be deactivated again, the employee should repeat steps 3 to 5 of this procedure before work resumes.

6.3.2 If the work is completed and a lock remains on the equipment, it shall not be removed until the employee responsible for the lock is found or the supervisor of the employee investigates and ascertains that the equipment is safe to operate. Unauthorized removal of a lock will subject the violator to disciplinary action up to dismissal.

6.4 TRAINING

Initial and annual training will be given to all employees to ensure that the purpose and function of this energy and control program are understood.

6.5 PERIODIC INSPECTION

The Site Safety and Health Officer will conduct an annual audit of the energy control program to ensure that the requirements of these procedures are being followed. A record of annual audits will be kept to comply with the requirement for periodic inspections.

STANDARD OPERATING PROCEDURE
NUMBER 7

MEDICAL SURVEILLANCE, CONTROL/ACCESS TO EMPLOYEE MEDICAL RECORDS, AND EMERGENCY CARE

SOP 7 - MEDICAL SURVEILLANCE, CONTROL/ACCESS TO EMPLOYEE MEDICAL RECORDS, AND EMERGENCY CARE

7.1 INTRODUCTION

The medical surveillance program is a major element in the Parsons Health and Safety Program. The three major components of the medical surveillance program are: (1) routine medical monitoring of the health of Parsons personnel whose work may expose them to health hazards, (2) arrangements for emergency medical care in the event of a work-related injury, and (3) maintenance of employee medical records.

7.2 MEDICAL SURVEILLANCE

7.2.1 Enrollment Criteria

7.2.1.1 A medical examination is essential to assess and monitor a worker's health and fitness both before placement and during the course of work. The criteria for medical surveillance enrollment are dependent upon the employee's exposure potential. An employee whose work involves the regular, potential exposure to toxic substances or physical agents above established short-term exposure limits (STELs), OSHA permissible exposure limits (PELs), OSHA action levels, or American Conference of Governmental Industrial Hygienist (ACGIH) threshold limit values (TLV) shall be enrolled in the medical surveillance program. Examples of operations where employee enrollment would be necessary include.

- Field investigations or remedial operations at gasoline stations or bulk storage terminals;
- Field investigations in a designated exclusion zone;
- Work requiring respirator usage;
- Laboratory use of hazardous substances;
- Asbestos or lead sampling or abatement;
- Stack sampling and source evaluation operations; and
- Industrial wastewater and process water characterization surveys.

7.2.1.2 An employee assigned to a task where there is no reason to believe there is a potential for exposure above STELs, OSHA PELs, OSHA action levels, or ACGIH TLVs would be exempt from the medical surveillance program. Examples of exempted operations would include the following:

- Project management oversight from support zone;
- Property transfer audits where there is no environmental sampling;
- Laboratory operations confined to dip and read tests;

- Brush clearing and land survey operations; and
- Ecological surveys.

7.2.2 Medical Oversight Contractor

7.2.2.1 Parsons has hired a medical oversight contractor (MOC) to manage its medical surveillance program. The MOC is Work Care, (phone: 800-455-6155). The responsibilities of the MOC are:

- Develop medical examination protocols specific to Parsons' operations;
- Contract local clinics;
- Issue employee medical reports to the Program Health and Safety Manager (PHSM);
- Track personnel enrolled in medical monitoring program; and
- Archive employee medical and exposure records.

7.2.2.2 The MOC provides Parsons with consistency in examination content and quality.

7.2.3 Clinic Selection

The MOC or Site Safety and Health Officer (SSHO) will perform initial clinic selection. If the clinic is selected by the SSHO, the MOC conducts a quality control review of the clinic. If the clinic passes the QC review it will be contracted into the MOC clinic network and can be used by Parsons' employees.

7.2.4 Pre-Placement Screening

All employees who will be involved in the medical surveillance program will have an initial physical examination before assignment to work requiring regular health monitoring. The pre-placement screening has two major functions: (1) to determine the employee's fitness for duty, including the ability to work while wearing protective equipment and (2) to establish a baseline physiological profile for comparison with future medical data. The physical examination will be given by an approved clinic and will follow the examination protocol established by the MOC. For those Parsons employees working on the project, the MOC has been asked to review Department of Army Pamphlet 40-173, Occupational Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, and HT. The MOC will add additional medical tests or exams as appropriate.

7.2.5 Periodic Examinations

Physical examinations are repeated annually for personnel involved in HTRW, OE, and CWM projects. Records of project personnel working on this project will be checked to ensure that periodic examination has occurred within the last year.

7.2.6 Termination Examination

A physical examination shall be performed as a part of the checkout procedure for terminating employees. The content of this examination shall comply with the protocol established by the MOC. For this project, each Parsons employee who works on-site will also receive a project termination physical as directed by the MOC – in accordance with DA Pamphlet 40-173.

7.2.7 Special Examination

Special medical examinations and counseling will be provided in cases of known or suspected exposure to a toxic substance above its occupational exposure limit. The SSHO must approve special testing after consulting the Program H&S Manager and MOC physician.

7.2.8 Information Provided to the Examining Physician

Each employee participating in the medical surveillance program will present to the examining physician a completed History and Physical Form at the time of the examination. The History and Physical Form is designed to elicit information necessary for the physician to understand the employee's past and current health status. Additionally, the form provides an opportunity for the employee to express possible concerns about his or her occupational environment.

7.2.9 Medical Examination Reports

7.2.9.1 Data obtained during the examination is sent to the MOC physician for analysis. After reviewing the data, the MOC physician submits a report to the Program Health and Safety Manager who forwards the results to the SSHO. This report contains the following information:

- Physician's opinion of the employee's fitness to perform their assigned duties;
- Any recommended limitations upon the employee's assigned duties; and
- Statement that the employee has been informed of the physician's findings and of any medical conditions that require further examination or treatment.

7.2.9.2 Additionally, the employee receives a report from the MOC physician that discusses all aspects and findings of the medical examination.

7.2.10 Disposition of Medical Records of Terminated Employees

When an employee leaves Parsons, the MOC shall seal the employee's medical file for archiving. The medical file will be maintained in the custody of the MOC for 30 years after the employee's termination date.

7.2.11 Confidentiality of Reports

The medical report that is submitted to the PHSM and forwarded to the SSHO shall not reveal any specific findings or diagnoses unrelated to occupational exposures, illnesses, or accidents. Reports shall be maintained either electronically (encrypted) or in paper format (in file with access restricted). Access to the physician's report shall only be accessible to the SSHO and Program Health and Safety Manager unless authorized in writing by the employee or except where the opinions are required for settlement of workers' compensation claims.

7.2.12 Subcontractor Medical Certification

Subcontractors assigned to work on the project are required to furnish the Project Manager or SSHO a doctor's certification of each assigned employee's ability to wear personal protective equipment. The certification should be dated not more than 1 year before the employee begins on-site work.

7.3 EMERGENCY MEDICAL CARE

7.3.1 Emergency treatment is integrated into the Emergency Response and Fire Prevention Plan (SOP 8.0). This plan requires posting of the name, a map showing its location, phone number, and address of the nearest emergency care center. In addition, phone numbers and procedures for contacting fire, police and ambulance services are included in the emergency response portions of this plan. The Emergency Response and Fire Prevention Plan designates roles and responsibilities to be assumed by personnel in an emergency. At least two members of the field team will be currently certified in cardiopulmonary resuscitation (CPR) and first aid.

7.3.2 A map with directions to the nearest medical facility will be posted at the worksite. All personnel working at the site should know the location of the nearest medical facility. The SSHO will report all incidents requiring emergency medical attention to the PHSM and GBU Safety Manager.

7.4 PROGRAM RESPONSIBILITY

The SSHO is responsible for assuring that site workers are incompliance with this SOP. In addition the SSHO sets-up employee exam through the MOC.

7.5 PROGRAM COSTS

Routine medical monitoring is the responsibility of Parsons, and the company will bear the entire cost of the program. Special, project-specific medical examinations will be included in the project budget.

STANDARD OPERATING PROCEDURE
NUMBER 8

EMERGENCY RESPONSE AND FIRE PREVENTION PLAN

SOP 8 - EMERGENCY RESPONSE AND FIRE PREVENTION PLAN

8.1 PRE-EMERGENCY PLANNING

8.1.1 Situations requiring emergency response can be minimized by planning and approaching the circumstances in a calm, deliberate manner.

8.1.2 Agencies that may provide emergency response, such as the Emergency Management Agencies (EMAs), police department, Fire Department and medical support services will receive an operations schedule on a daily or weekly basis.

8.1.3 The SSHO will be the on-site project emergency coordinator (as conditions dictate) in case of an accident or incident requiring emergency response. All personnel will be briefed at the morning tailgate safety meetings the location of the cellular telephones and who has on-site radio communications. This information will also be included in all visitor briefings.

8.1.4 A warning system using a series of three five-second blasts on portable air horns or vehicle horns will notify site personnel that an accident or incident has occurred and evacuation is required. Upon hearing the evacuation warning, all personnel will immediately clear the site and respond to the designated rally point. This rally point will be revised based upon prevailing weather conditions and will be briefed by the SSHO at the morning tailgate safety briefing. At the rally point, all personnel will be accounted for and interviewed to assure no one has sustained injuries because of the accident or incident.

8.1.5 If an emergency response rescue operation is required, no personnel will re-enter the area until the situation has been assessed and it is determined that resources are on-hand to handle the rescue without jeopardizing additional personnel.

8.2 PERSONNEL ROLES AND LINES OF AUTHORITY

8.2.1 This plan describes the various roles, responsibilities, and communication procedures that will be followed by personnel working on this project in the event of an emergency.

8.2.2 The primary On-Site Project Emergency Coordinator for this site is the on-site Parsons SSHO or his designee (Site Manager). The on-site Emergency Coordinator will determine the nature of the emergency and take appropriate action.

8.2.3 Prior to field activities, the Parsons SSHO shall plan emergency egress routes and discuss them with all personnel who will be conducting fieldwork. Initial planning

includes establishing and testing emergency warning signals and evacuation routes to prevent delays in the event of an emergency.

8.3 EMERGENCY CONTACTS

Emergency telephone numbers for the closest hospitals capable of providing emergency service, EMAs, Poison Control Center, local Police and Fire Department, and key safety and management personnel from the Corps of Engineers (COE) District, and Parsons will be listed in the Work Plan and will be posted in the field trailer and other conspicuous locations. The SSHO will be responsible for taking necessary action and contacting the appropriate emergency contacts.

8.4 EMERGENCY RECOGNITION AND PREVENTION

Emergencies can take many forms: exposure to chemical agents or industrial chemicals of various types, illnesses or injuries, chemical exposure, fires, or sudden changes in the weather. The remaining sections of the ERCP outline general emergency and contingency planning procedures to be followed at the site. Emergency information and instructions shall be posted as appropriate.

8.5 EMERGENCY EVACUATION FROM EXCLUSION AND CONTAMINATION REDUCTION ZONES

Any personnel requiring emergency medical attention shall be evacuated immediately from Exclusion and Contamination Reduction Zones. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life saving first aid (e.g., victims contaminated with mustard or lewisite). For others, decontamination may aggravate the injury or delay life saving treatment. If decontamination does not interfere with essential treatment, it should be performed.

8.5.1 If decontamination can be performed:

- Wash external clothing and cut it away.

  NOTE: soap and water will be used to decontaminate injured victims potentially contaminated with mustard or lewisite.

8.5.2 If decontamination cannot be performed:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel
- Alert emergency and off-site medical personnel to potential contamination; instruct them about specific decontamination procedures
- Send along site personnel familiar with the incident

8.6 FIRST AID

8.6.1 At least two people trained and certified in First Aid/CPR will be present on-site at all times during intrusive activities. This may include on-site staff or the Emergency Medical Technicians on-site. Life support techniques such as CPR and treatment of life threatening problems such as shock will be given top priority. Professional medical assistance shall be obtained at the earliest possible opportunity.

8.6.2 To provide first-line assistance to field personnel in the case of illness, injury, or fire the following items will be immediately available:

- First aid kit;
- Portable emergency eye wash;
- Supply of clean water and 5 percent bleach solution;
- Fire extinguisher;
- Portable spill kit or equivalent (30 gallon size);
- Air horn; and
- Cellular telephone or 2-way radio

8.7 EMERGENCY ACTIONS

If actual or suspected serious injury occurs, these steps shall be followed:

- Remove the exposed or injured person(s) from immediate danger.
- Render first aid if necessary. Decontaminate affected personnel after critical first aid is given, if chemical agent exposure is suspected.
- Obtain paramedic services or ambulance transport to local hospital. This procedure shall be followed even if there is no visible injury.
- Other personnel in the work area shall be evacuated to a safe distance until the Emergency Coordinator determines that it is safe for work to resume. If there is any doubt regarding the condition of the area, work shall be delayed until all hazard control issues are resolved.
- Notify USACE, Parsons Project Manager, and Project Health and Safety Officer. USACE will make the required notifications to State and County Agencies.

8.8 EMERGENCY EVACUATION PLAN

8.8.1 General Evacuation Plan

8.8.1.1 In the case of an operational shutdown due to severe weather conditions, or if other hazards exist on-site, the Emergency Coordinator or Site Manager will sound the alarm (three blasts each of five second duration on an air horn). All personnel in the work area will secure their equipment and proceed to the off-site assembly point, located a safe distance (designated at morning safety meeting) at an upwind location from the

site. The Emergency Coordinator or his alternate will obtain the site entry/exit logs to ensure that all personnel have been safely evacuated. The Site Manager will coordinate with the Emergency Coordinator to determine when it is safe to re-enter the site and resume work.

8.8.1.2 In the general case of a large fire, explosion, or toxic vapor release, a site evacuation shall be ordered and the following steps implemented:

- Sound the alarm (three blasts each of a five-second duration on an air horn), notify appropriate emergency response agencies, and advise USACE and Parsons project management personnel.
- Evaluate downwind impact in order to assist emergency response agencies. All personnel will evacuate in the upwind direction.
- All personnel will assemble in an upwind area when the situation permits, and a head count will be taken.
- Determine the extent of the problem. Dispatch a response team in protective clothing and self-contained breathing apparatus on-site to evacuate any missing personnel (when conditions do not endanger safety of rescue personnel) and to correct the problem.

8.8.2 Evacuation Signals and Routes

8.8.2.1 Two-way radio communication, direct voice communication, or an air-horn (three blasts - each of five seconds duration) will be used to notify employees of the necessity to evacuate an area involved in a release/spill of a hazardous material. Each work location will have a two-way radio. A two-way radio will be in the Parsons command post to monitor for emergencies. Total site evacuation will be initiated only by the Emergency Coordinator. However, in his absence, the decision to preserve the health and safety of employees will take precedence.

8.8.2.2 Evacuation routes will be discussed and described in tailgate safety meetings. The route to the Medical Center will be posted in each work area. Periodic drills (before each new phase of work) will be conducted to familiarize each employee with the proper routes and procedures.

8.8.3 Evacuation Procedures

In the event evacuation is necessary, the following actions will be taken:

- The alarm will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle and equipment traffic within the site will cease to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery and equipment, if safe to do so.

- All on-site personnel, visitors, and contractors in the Support Zone will assemble at the office trailer, or other designated area, for a head count and wait for further instructions from the Emergency Coordinator.
- Upon completion of the head count, the senior person will provide the information to the Emergency Coordinator.
- Visitors will also be accounted for.
- A final tally of persons will be made by the Emergency Coordinator or his designee. No attempt will be made to find persons not accounted for if the rescue attempt involves endangering the lives of employees.
- Personnel will be assigned by the Emergency Coordinator to be available at the main entrance point to direct and brief emergency responders.
- Re-entry into the site will be made only after clearance has been given by the Emergency Coordinator. At his direction, a signal or other notification will be given for re-entry into the facility.
- Drills will be held at the beginning of the intrusive fieldwork and at intervals during the intrusive work. Drills will be treated with the same seriousness as an actual emergency.

8.9 EMERGENCY ALERTING AND RESPONSE

To minimize hazards to the environment or to human health, the procedures listed below are to be implemented in the event of a spill or discharge involving a hazardous substance. It is the responsibility of on-site employees to report any such emergencies to the on-site Emergency Coordinator who will be responsible for implementing emergency response procedures.

8.9.1 Initial Notification

- STEP 1: Notify appropriate management personnel in the following order until one of these people are contacted. Senior ranking person will take over responsibilities when they arrive.

  Contact

  1st. Parsons Site Manager
  2nd. Parsons SSHO
  3rd. Parsons UXOQC

- STEP 2: If the emergency coordinator determines that assistance is needed to respond to the emergency, he/she can notify the appropriate personnel. The Emergency Contact List will be posted onsite.
- STEP 3: If the on-site Emergency Coordinator determines that a spilled material is "in such quantity or concentration as may be harmful or poses a foreseeable risk of harm to public health or welfare or to natural resources," the coordinator will immediately notify the appropriate personnel.

- STEP 4: The USACE Project Representative will be notified immediately and given a copy of the spill report within 48 hours. He/she will be advised concerning all notification and response actions. Depending on type of spill, it may be necessary to notify local and state agencies. Determinations as to reportable quantities for specific chemicals or materials will be obtained by the Site Manager from state regulatory agency. The state notification will be accomplished after notifying USACE and following emergency response actions.
- STEP 5: The on-site emergency coordinator will contact the National Response Center (800-424-8802) when a hazardous substance is released in excess of the reportable quantity.

8.10 EMERGENCY SERVICES

All personnel shall be provided concise and clear directions and accessible transportation to local emergency services. A map outlining directions to the nearest hospital will be posted on-site.

8.10.1 Emergency Equipment

In the decontamination area, an emergency equipment station will be present. This station will consist of a combination emergency eye wash station, first aid kit, two-way radio or cellular phone, emergency alarm (e.g., air horn), and a fire extinguisher. Each piece of heavy equipment, site trailer, and each vehicle will be equipped with a fire extinguisher.

8.10.2 Critique of Response and Follow-up

All response actions will be evaluated for effectiveness by SSHO and Site Manager. Corrective actions will be communicated to personnel and procedures will be revised as required.

8.11 SPILL INCIDENT REPORTS

A written report detailing the spill or discharge shall include, at a minimum, the cause and resolution of the incident, the date the incident occurred, and any outside agencies involved. The report shall be submitted to the USACE within 48 hours of the incident.

8.11.1 Special Notifications and Procedures in the Event of a Spill

Additional notifications, including emergency telephone numbers, if needed, for local, state, and federal agencies which may require notification are included in the Notification Plan kept onsite.

- If the incident threatens human health or the environment outside of the project site boundaries, the emergency coordinator will notify the local Police Department first, then the local Fire Department, and the Emergency

Management Agency. Assistance will be provided to these organizations to determine if public evacuation is necessary.

- If a reportable quantity of a hazardous material is released off-site, the Emergency Coordinator will notify the National Response Center (800-424-8802). The following information will be provided to the National Response Center:
  - Name and telephone number
  - Name and address of facility
  - Time and type of incident
  - Name and quantity of materials involved, if known
  - Possible hazards to human health and/or the environment outside of the facility
- If hazardous waste has been released or produced through control of the incident, ensure that:
  - Waste is collected and contained
  - Containers of waste are removed or isolated from the immediate site of the emergency
  - Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided
  - Ensure that all emergency equipment used is decontaminated, recharged, and ready for use before site operations are resumed

8.12 FIRE PREVENTION AND CONTINGENCY MEASURES

8.12.1 Because flammable materials are present at this site, fire is an ever-present hazard. Parsons and subcontractor personnel are not trained professional fire fighters. Personnel will attempt to extinguish incipient (early) stage fires using portable fire protection equipment. Therefore, in the event of any fire that cannot be extinguished using portable extinguishers, personnel will notify the Emergency Coordinator by radio and evacuate the area. The Emergency Coordinator will immediately notify the local Fire Department.

8.12.2 The following procedures will be used to prevent the possibility of fires and resulting injuries.

- Sources of ignition will be kept away from areas where flammable materials are handled or stored.
- The air will be monitored for explosive vapors before and during hot work and periodically where flammable materials are present, and during confined space work. Hot work permits will be required for all such work.

- Fire extinguishers will be placed in all areas where a fire hazard may exist.
- Before workers begin operations in an area, the senior person will give instruction on egress procedures and assembly points.

8.12.3 The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify his or her Supervisor who will then contact the Emergency Coordinator by radio. Portable fire extinguishing equipment will be used to the extent practicable or the Emergency Coordinator will activate the emergency alarm (three blasts for site evacuation) and notify the local Fire Department.
- When the emergency alarm sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest exit point/assembly area.
- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at the assembly point for the site for a head count.
- When a small fire has been extinguished, the Emergency Coordinator will be notified.

8.13 HAZARDOUS WEATHER CONTINGENCY MEASURES

8.13.1 The Emergency Coordinator will be responsible for assessing hazardous weather conditions (i.e., high winds, tornado, etc.) and notifying personnel of specific contingency measures. Notifications will include:

- Parsons employees, subcontractors, and visitors
- USACE Project Manager and the Ordnance and Explosives Site Safety (OESS)

8.13.2 Operations will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds (>40 mph)

8.13.3 The response to these conditions includes the following actions:

- Excavation/soil stockpiles will be covered with visqueen/plastic and temporary barricades will be placed along perimeter of open excavation.
- All equipment will be shut down and secured to prevent damage.
- Personnel will be moved to safe refuge, initially crew trailers. The Emergency Coordinator will determine when it is necessary to evacuate personnel to off-site locations.

8.14 CHEMICAL SPILLS OR RELEASES

The occurrence of chemical leaks or spills is anticipated to be remote, due to the preventative measures implemented on the site and the nature of the contaminated materials present. There is, however, a potential for the occurrence of spills or leaks due to spills from fuels, oils, etc., used in vehicles or heavy equipment. Salvage drums, spill containment, and sorbent material will be available for personnel to respond in the event that such a release should occur. Safe handling procedures will be implemented in order to minimize the handling required to over-pack the drums and stage them in a designated area. The following actions will be taken in the event of a release of any chemical, fuel, or contaminated water at the site:

- **Small Quantity Spill:** This will be defined as 25 gallons or less of liquid material. Before responding, make sure personnel are in the appropriate level of protection. Use sorbent material as necessary to effect cleanup, and containerize all liquids and debris. Make sure the incident is immediately reported to the USACE Project Manager and OESS.
- **Large Quantity Spill:** This will be defined as over 25 gallons of liquid material. Immediate notification will be made to the Site Manager and USACE Project Manager and OESS. The Site Manager will direct efforts to contain and mitigate the spill, as well as coordinate with the USACE Project Manager and local officials to determine if additional notification or area evacuation is required. The SSHO will be responsible for performing air monitoring.

8.15 SPILL PREVENTION AND CONTROL PROCEDURES

8.15.1 During site preparation, primary staging areas will be constructed. Proper bermed and lined staging areas will reduce the amount of cleanup required as a result of spills or leaking drums.

8.15.2 A sufficient supply of appropriate emergency response cleanup and personal protective equipment will be visually inventoried and inspected on a weekly basis by the SSHO.

8.15.3 The materials listed below may be kept on-site for spill control. The majority of this material will be located in the support zone inside a supply trailer. Small quantities of appropriate materials may be placed on pallets and located in the active work areas.

- Sand or clay to solidify/adsorb liquid spills.

The following equipment will be kept on-site and dedicated for spill cleanup:

- Sausage-shaped absorbent booms for diking liquid spills, drains, or sewers;
- Sorbent sheets (diapers) for absorbing liquid spills;
- Over-pack drums for containing leaking spills; and

- Fifty-five gallon open-top drums for containing waste materials.

8.15.4 All contaminated soils, absorbent materials, solvents, and other materials resulting from the cleanup of spilled or discharged substances will be properly stored, labeled, and disposed of off-site.

8.16 CHEMICAL SPILL CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken immediately:

- Administer first aid to injured/contaminated personnel. Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.
- Warn unsuspecting person/vehicles of the hazard. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons.
- Stop the spill at the source, if possible. This may involve activities such as uprighting a drum, closing a valve, or temporarily sealing a hole with a plug.
- Using radio communications, notify the Emergency Coordinator of the spill/release, including information on material spilled, quantity, personnel injuries, and immediate life threatening hazards.
- Follow procedures outlined earlier for the notification of proper on-site personnel and off-site agencies.

8.16.1 Containment and Control Measures

8.16.1.1 The Emergency Coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include, but not be limited to:

- Constructing a temporary containment berm using on-site clay absorbent earth.
- Digging a sump, installing a polyethylene liner, and diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground.
- Transferring the material from its original container to another container.

8.16.1.2 Supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to: backhoe or trackhoe, shovel, rake, clay absorbent, polyethylene liner, personal safety equipment, and miscellaneous hand tools. The major supply of material and equipment will be located in a supply trailer in the Support Zone. Smaller quantities of supplies will be kept at active work locations for emergencies.

8.16.2 Cleanup Inspection and Notification

8.16.2.1 The Emergency Coordinator/Site Manager will jointly inspect the spill site to determine that the spill has been cleaned up. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort.

8.16.2.2 The Emergency Coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The Emergency Coordinator will review the cause with the SSHO, PSHO, and USACE Project Manager and obtain concurrence with the remedial action plan.

8.17 TRANSPORTATION SPILL INCIDENTS

Spillage resulting from site transportation incidents will be immediately reported to the Emergency Coordinator, who will send personnel to contain and clean up the spill (if possible without risk to personnel). Any soils contaminated by the spill incident will be removed and processed as described in the Work Plan.

8.18 FIRE AND AIRBORNE RELEASE PROCEDURES

8.18.1 The following preventative measures will be implemented to minimize the potential for airborne chemical release and fire incidents:

- Operate the intrusive excavation and trenching operations in accordance with the Work Plan (Section 3) and the APP (Appendix D) for this site.
- Perform air monitoring activities to evaluate airborne releases of chemical agent and industrial chemicals.

8.18.2 In addition, the following fire prevention measures will be implemented on site:

- Sources of ignition other than heavy equipment will be prohibited inside the Exclusion Zone during intrusive activities.

STANDARD OPERATING PROCEDURE
NUMBER 9

HAZARD COMMUNICATION PROGRAM

SOP 9 - HAZARD COMMUNICATION PROGRAM

9.1 INTRODUCTION

9.1.1 The OSHA Hazard Communications Standard (29 CFR 1910.120) was promulgated to ensure that all chemicals would be evaluated and information regarding the hazards associated with these chemicals would be communicated to employers and employees. The goal of the standard is to reduce the number of chemically related occupational illnesses and injuries.

9.1.2 In order to comply with the OSHA Hazard Communication Standard, this written program has been established by Parsons for work at this site. All Parsons and subcontractor personnel working at the site are included in this program. A copy of this written program will be maintained at the office trailer for inspection by employees.

9.2 HAZARDOUS CHEMICAL INVENTORY LIST

The SSHO will maintain an inventory of hazardous chemicals brought to the site (fuels, oils, solvents, etc). The inventory should include the chemical identity, quantity, and storage location. For each chemical identified on the inventory list there should be a corresponding Material Safety Data Sheets (MSDS). Subcontractors must understand that they are required to inform the SSHO whenever they import hazardous chemical on-site.

9.3 HAZARD DETERMINATION

The most hazardous chemicals potentially present at this site are chemical agents (mustard and lewisite). Other industrial chemicals associated with decontaminants or solvents may also be present at this site. MSDSs for these compounds will be maintained on-site and be available at the site trailer.

9.4 MATERIAL SAFETY DATA SHEETS (MSDS)

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

- Chemical and common names;
- Physical and chemical characteristics;
- Physical hazards;
- Health hazards;
- Primary routes of entry;
- Exposure limits;

- Carcinogenic potential;
- Handling and protective precautions;
- Control measures;
- Emergency and first aid procedures;
- Date of MSDS preparation; and
- Name and address of manufacturer.

9.4.2 When chemicals are ordered, the Site Manager or his designee will specify on the purchase order that chemicals are not to be shipped without corresponding MSDSs. When chemicals and MSDSs arrive, the SSHO or his designee will review them for completeness. If any MSDS is incomplete, a letter or FAX will be sent immediately to the manufacturer requesting the additional information. Parsons or its subcontractors will not accept any shipped chemical without an MSDS.

9.4.3 A complete file of MSDSs for all on-site hazardous chemicals will be kept in the office trailer on site. When an MSDS is discovered as missing the Site or Project Safety and Health Officer will obtain a replacement MSDS from the manufacture.

9.5 LABELS AND OTHER FORMS OF WARNING

9.5.1 The Hazard Communication Standard requires that manufacturers label the hazardous chemicals they produce. The label must contain the following:

- Chemical identity;
- Appropriate warnings; and
- Name and address of manufacturer, importer, or other responsible party.

If the labels are incomplete or missing, Parsons personnel will refuse the shipment.

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

9.5.3 The labeling procedure will be periodically reviewed by the SSHO and changed as necessary.

9.6 EMPLOYEE INFORMATION AND TRAINING

9.6.1 Prior to starting work, Parsons personnel and subcontract employees will attend a site specific health and safety training course. This course will include Hazard Communication Training and will be performed by the Site Safety and Health Officer. The format will be classroom training.

Training Topics

- An overview of the requirements of the Hazard Communication Standard
- The labeling system and how to use it
- How to review MSDS and where they are kept
- Chemicals present in work operations
- Properties and characteristics of chemical warfare agents
- Physical and Health effects of hazardous chemicals
- Methods and observation techniques used to determine the presence or release of hazardous chemicals in the area
- Personal protective equipment and work practices to reduce or prevent exposure to chemicals
- Steps to be taken to prevent or reduce exposure to chemicals
- Safety-emergency procedures to follow if exposure occurs
- Location and availability of written program/MSDSs

9.6.2 Following the training session(s), each employee will sign and date the training record.

9.6.3 Additional training may be provided by the SSHO when new chemicals are imported to the site. Records of additional training will be maintained by the SSHO.

9.7 PROGRAM REVIEW

This written hazard communications program will be reviewed by the SSHO and/or PSHO on a monthly basis and updated as necessary.

Reviewed and Approved by:

Project Safety and Health Officer: _____
Ed Grunwald

Site Manager: _____

Site Safety and Health Officer: _____

STANDARD OPERATING PROCEDURE
NUMBER 10

ELECTRICAL SAFETY

SOP 10 - ELECTRICAL SAFETY

10.1 INTRODUCTION

10.1.1 Objective

Parsons and subcontract personnel working on electrical systems and equipment at this site will follow standards set by the National Electrical Code (NEC) and OSHA. Only qualified personnel will be permitted to work on electrical systems and equipment.

10.1.2 Purpose

This procedure specifies the requirements for electrical equipment and methods and is an overview of the requirements of 29 CFR 1926, Subpart K-Electrical. If work is to be performed on any electrical circuit, lockout/tagout may be required. Refer to the Lockout/Tagout procedure SOP. Fieldwork at this site will involve work at temporary facilities and will use temporary electrical systems. To prevent electrical shocks electrical safety must be emphasized.

10.2 GENERAL REQUIREMENTS.

- No electrical work is done on an energized circuit.
- Only approved, qualified electricians are permitted to work on electrical equipment or electrical wiring.
- Use proper clearance and grounding procedures. All electrical circuits and equipment is de-energized and locked out before maintenance or repair work is started.
- Single-phase electric hand tools and other single-phase portable electrical equipment must be approved by a recognized testing agency, and all exposed non-current-carrying metal parts must be grounded or double insulated.
- Before each use, portable electrical tools are to be examined for obvious defects in the appliance, cord, and plug. If any deficiency is noted, the tool is not to be used.
- Extension cords are to be kept clean, dry, free of kinks, and protected from oil, hot or sharp surfaces, and chemicals. Extension cords used outdoors shall be equipped with Ground Fault Circuit Interrupters (GFCI) and rated for outdoor use.

10.3 PORTABLE ELECTRICAL EQUIPMENT

- Portable electrical tools not provided with grounding protection are not to be used on-site.

- Portable electrical appliances and equipment with non-current-carrying metal parts that can contact personnel shall be grounded by a continuous conductor from the device to a grounded receptacle. The SSHO shall resolve any questions that arise as to whether or not a particular appliance should be grounded.
- Grounding of receptacles shall be accomplished in one of two ways:
  - A built-in ground wire of green color may be attached to the ground pole of the receptacle.
  - The conduit system, if installed in an approved manner, may be relied upon for grounding of a receptacle serving single phase appliances with ratings up to 230 volts.

  At outside locations, all single-phase 15- and 20-ampere receptacle outlets (operating at 230 volts or less) which are not a part of the permanent wiring of the building or structure must have GFCI for personnel protection. The GFCI should be located at the power source so that all extension cords and tools are protected by the GFCI.
- The outlet box for portable extension cords for outdoor use shall be of weatherproof type maintained in good condition.

10.4 ELECTRICAL GUARDING

- Suitable access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance.
- The dimensions of the access and working space around energized parts in switchboards, control panels, fused switches, circuit breakers, panel boards, motor controllers, and similar equipment (which require examination, adjustment, servicing, or maintenance while energized), shall not be less than 36" in depth (30" for installations built prior to 1981) and 30" wide or the width of the equipment, whichever is greater.
- The access and working space shall not be used for storage purposes. The "keep clear" area may be identified with suitable markings and/or posting of signs or decals on the equipment.
- Energized parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by the use of approved cabinets or enclosures.
- Entrance to rooms and other guarded location containing exposed energized parts shall be marked with a conspicuous warning sign forbidding unqualified persons to enter.
- Temporary covers, warning signs, and/or barricades are to be used when it is necessary to remove covers of electrical panels during construction, major refurbishment, or for the purpose of providing temporary power to an area.

- All openings in boxes, enclosures, or fittings shall be effectively guarded or closed to afford protection substantially equivalent to that of the wall of the box, enclosure, or fitting.
- All electrical components over 230 volts shall have signs stating "High Voltage."

10.5 EXTENSION CORD REQUIREMENTS

- Use of indoor extension cords greater than 50 feet in length is to be discouraged. All extension cords shall include a grounding conductor within the cable jacket and shall be equipped at each end with either explosion-proof or non-explosion-proof three-wire, grounded receptacles and plugs (but not with one of each), depending on the location and intended use. (No "hybrid," ungrounded or external ground wire extension cords are allowed.)
- If a cord is damaged, it shall be shortened or replaced by an electrician - never patched with electrical tape.
- Cords shall be protected against contact with oil, hot surfaces, and chemicals.
- Cords must not be hung over nails or other sharp edges or places where vehicles may run over them.

10.6 ELECTRICAL FUSE REQUIREMENTS

- Circuits must be de-energized by lockout and tagout procedures before attempting to replace fuses.
- Bridging of fuses or circumventing the normal operation of circuit breakers is prohibited.
- Blown fuses shall not be replaced with fuses having a higher amperage or voltage rating. Fuses should be replaced in kind to maintain proper circuit protection.
- Use a fuse puller to remove fuses.

10.7 ASSURED ELECTRICAL GROUNDING REQUIREMENTS

- This program provides the minimum requirements for an assured equipment grounding conductor program and reflects the requirements of 29 CFR 1910.304. It also applies to circuits and equipment not attached to a permanent building or structure.
- Parsons and its Subcontractors will implement either a written assured equipment grounding conductor program or use GFCI's when using temporary wiring (cords and plugs) in field work using any temporary electrical power source.
- Cords and equipment will be inspected prior to each use for damage or missing parts. Equipment that is found to be defective will be taken out of service and repaired.

- If an Assured Equipment Grounding Conductor Program is used it shall include the following:
  - This written program.
  - Designation of a competent person(s) – Site Safety and Health Officer – to implement the program.
  - Visual inspection of cords on a daily basis for deformed and missing pins, insulation damage, and indications of possible internal damage. Equipment found damaged or defective will be removed from service and repaired or expended.
  - Cords and electrical circuits will be tested for the following:
    - ◊ Electrical grounding continuity
    - ◊ Correct attachment of grounding conductor
  - Tests outlined above shall be performed before the first use, before being returned to use after repair, after possible damage (such as being run over by a vehicle), and at least every three months.
  - The tests outlined above must be recorded in the Health and Safety logbook along with the ID of the cords that were tested.

STANDARD OPERATING PROCEDURE
NUMBER 16

SEVERE WEATHER OPERATIONS

SOP - 16 SEVERE WEATHER OPERATIONS

16.1 PURPOSE

The purpose of this procedure is to provide the minimum requirements and site personnel actions in the event of site evacuation, as a result of severe weather at any Parsons Field operation.

16.2 SCOPE

This SOP applies to all site personnel involved in field operations regardless of affiliation. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in Section 16.3 of this SOP for additional compliance issues.

16.3 REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of Severe Weather operations:

- Parsons Corporate Safety and Health Program;
- EM 385-1-97, Explosives Safety and Health Requirements Manual;
- EM 1110-1-4009, Ordnance and Explosive Response; and
- EM 385-1-1, USACE, Safety and Health Requirements Manual

16.4 RESPONSIBILITIES

16.4.1 Site Safety and Health Officer (SSHO)

16.4.1.1 Upon notification that a severe weather situation exists, the SSHO will notify site personnel, by radio, cellular phone or sound a horn for 3 five-second blasts. If operations, that might put site personnel at risk, are on going at the time, either the SSHO or USACE On-Safety Representative will cease all operations and have all teams/crews evacuate to either the site office or the closest "Safe Haven."

16.4.1.2 The SSHO will direct site personnel as to the nature of severe weather and to ready site vehicles for evacuation. During this type of emergency, site personnel should not be concerned with assigned vehicles. Time permitting, a select number of site personnel will attempt to safely secure mission essential equipment (e.g. Geophysical GPS/Radio Relay Systems, RTK GPS Systems, computers, etc.) and prepare to evacuate the area to the recommended "Safe Haven." The SSHO will maintain radio communications with all site personnel, necessary support elements and record the events in the site Safety Log.

16.4.1.3 Upon arrival at the "Safe Haven," the SSHO will conduct a head count of all site personnel and Site Visitors, using that day's Daily Safety Brief Sign-In Roster and Site Visitors Log.

16.4.2 Individual/Personnel initially reporting Severe Weather

The individual or personnel initially spotting a severe weather situation (lightning, tornado) will immediately report it to either the SSHO or the Ordnance and Explosives Safety Specialist (OESS) by the quickest means possible.

16.4.3 Site Personnel

Upon the notification to evacuate the work site for the designated Rally Point, site personnel will do so in an orderly manner. Vehicle operators will not exceed the posted or site enforced speed limit, unless directed by the OESS; however that speed will not exceed the conditions of the roadway.

16.4.4 USACE On-Site Safety Representative

Severe weather occurring before normal working hours, the OESS will decide whether a work delay is required and notify the SSHO. The SSHO will begin a site recall procedure with all site section supervisors, who will in turn notify their personnel.

16.5 GENERAL INFORMATION

16.5.1 The majority of Parsons field operations are conducted at either heavily wooded sites, or sites that consist of large rolling and sloping pastures and grasslands, consisting of clay or loose sand, and some even contain large areas of ravines and drop-offs. As a result of this, even small amounts of rain could cause vehicle entry/exit problems and personnel slipping hazards that may result in damage or injury to site personnel and equipment.

16.5.2 Almost all of the areas are susceptible to severe thunderstorms, with heavy downpours of rain, lightning, hail, strong microburst winds, flash floods and tornadoes. These storms are known to manifest themselves very quickly and leave very little time to react. In the event of severe weather in the area, the SSHO maintains a portable Severe Weather Alert radio and the Site Manager will have access to the National Weather Advisory system, via the internet or by phone.

16.5.1 Thunderstorms

16.5.1.1 Thunderstorms affect relatively small areas when compared with hurricanes and winter storms. Despite their small size, ALL thunderstorms are dangerous. The typical thunderstorm is 1.5 miles in diameter and lasts an average of 30 minutes. In order for a thunderstorm to form it needs three things; Moisture – to form clouds and rain; Unstable Air – warm air that can rise rapidly; and Lift – cold or warm fronts, sea breezes, mountains, or the sun's heat are capable of lifting air to help form thunderstorms.

16.5.1.2 The life cycle of a thunderstorm constitutes three distinct stages, which are detailed below:

- Developing Stage – Towering cumulus cloud indicates rising air; little if any rain during this stage; and occasional lightning.
- Mature Stage – Most likely time for hail, heavy rain, frequent lightning, strong winds, and tornadoes; storm occasionally has a black or dark green appearance; and lasts an average of 10 – 20 minutes but may last much longer in some cases.
- Dissipating Stage – Rainfall decreases in intensity; can still produce a burst of strong winds; and lightning remains a danger.

16.5.1.3 **How Far Away is the Thunderstorm?**

- Count the number of seconds between a flash of lightning and the next clap of thunder.
- Divide the number of seconds by five (5) to determine the distance to the lightning in miles.

16.5.2 Lightning

16.5.2.1 Lightning poses the greatest potential threat to site personnel and site operations, due to its unpredictable nature. Lightning results from the buildup and discharge of electrical energy between positively and negatively charged areas. Rising and descending air within a thunderstorm separates these positive and negative charges. Water and ice particles also effect distribution.

16.5.2.2 A cloud-to-ground lightning strike begins as an invisible channel of electrically charged air moving from the cloud toward the ground. When one channel nears an object on the ground, a powerful surge of electricity from the ground moves upward to the clouds and produces the visible lightning strike.

16.5.2.3 In accordance with current USACE policies, all operations cease when lightning is observed and the "Flash to Bang Time" is 30 seconds or less (approx 6 miles from site). The safe evacuation of personnel is paramount and equipment is secondary.

16.5.2.4 Those site personnel in and around the site office will seek shelter inside the building. Site personnel working out in the field will seek shelter inside a site vehicle with the windows rolled up and the doors closed.

16.5.2.5 Site personnel that are using any electronic equipment with an antenna (i.e. RTK system, G-858 or EM-61, etc.) will cease all operations and seek shelter upon visually seeing lightning at any distance.

16.5.2.6 **30/30 Lightning Safety Rule**

- Go indoors or seek shelter if, after seeing lightning, you cannot count to 30 before hearing thunder.
- Stay indoors or under shelter for 30 minutes after hearing the last clap of thunder.

16.5.2.7 **Lightning Safety Rules**

- Move to a sturdy building or car. Do not take shelter in small sheds, under isolated trees, or in convertible automobiles. Stay away from tall objects such as towers, fences, telephone poles, and power lines.
- If lightning is occurring and a sturdy shelter is not available, get inside a hard top automobile and keep the windows up. Avoid touching any metal.
- Utility lines and metal pipes can conduct electricity. Unplug appliances, office machines etc. not necessary for obtaining weather information. Avoid using the telephone or any electrical item. Use phones ONLY in an emergency.

16.5.2.8 **If Caught Outdoors and No Shelter is Available**

- Find a low spot away from trees, fences, and poles. Make sure the place you pick is not subject to flooding.
- If you are in the woods, take shelter under the shorter trees.
- If you feel your skin tingle or your hair stand on end, squat low to the ground on the balls of your feet. Place your hands over your ears and your head between your legs. Make yourself the smallest target possible and minimize your contact with the ground. DO NOT lay down.

16.5.3 Tornadoes

16.5.3.1 Tornadoes produce extreme high destructive winds and devastation. Tornadoes are generally produced along the leading edges of thunderstorms that form, with little or no warning. Before thunderstorms develop, a change in wind direction and an increase in wind speed with increasing height create an invisible, horizontal spinning effect in the lower atmosphere. Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical. An area of rotation, 2 to 6 miles wide, now extends through much of the storm. Most tornadoes form within this area of strong rotation.

16.5.3.2 Most project sites do not afford adequate tornado "Safe Havens," or adequate "Safe Havens" are so far away that they afford little or no help to those site personnel working in remote site locations.

16.5.3.3 The SSHO and Site Manager will attempt to locate those "Safe Havens" and brief site personnel of their locations, during the Daily Tailgate Safety Briefing.

16.5.3.4 **When and Where Tornadoes Occur**

- Tornadoes can occur any time of the year.

- Tornadoes have occurred in every state, but they are most frequent east of the Rocky Mountains during the spring and summer months.
- In the southern states, peak tornado occurrence is March – May, while peak months in the northern states are during the late spring and summer.
- Tornadoes are most likely to occur between 3 and 9 p.m., but can occur anytime.
- The average tornado moves from southwest to northeast.
- Tornadoes can accompany tropical storms and hurricanes as they move onto land.

16.5.3.5 Tornado Safety Rules

- In a building, move to a pre-designated shelter, such as a basement.
- If a below ground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture. Put as many walls as possible between you and the outside.
- Stay away from windows.
- Get out of automobiles.
- Do not try to outrun a tornado in your car; instead, leave it immediately for safe shelter.
- If caught outside or in a vehicle, lie flat in a nearby ditch or depression and cover your head with your hands.
- Be aware of flying debris. Flying debris from tornadoes causes most fatalities and injuries.
- Office trailers, even if tied down, offer little protection from tornadoes. You should leave an office trailer and go to the lowest floor of a sturdy nearby building, or follow the procedures detailed in the 6th bullet above.

16.5.4 Flash Floods/Floods

16.5.4.1 Due to the massive amounts of rain that can be dropped from thunderstorms, the site may be susceptible to flash floods. Some of the existing roads may be unimproved dirt and are easily turned into mud, creating an unsafe driving environment. Those roadways that are paved also place the vehicle in low-lying areas that may be washed out. Do not attempt to cross any roadway that has become submerged by water.

16.5.4.2 Flash Flood/Flood Safety Rules

- If you are in a low lying area, at the first sign of rain evacuate to high ground.
- Designate an evacuation route in the event of flooding.
- Avoid walking or driving in flood waters.

- Stay away from high water, storm drains, ditches, ravines, or culverts. If the water is moving swiftly, even water only six (6) inches deep can knock you off your feet.
- If you come upon flood waters, stop, turn around, and go another way.

16.5.5 Straight-line/High Winds

16.5.5.1 When this is associated with a passing front generating potential severe weather, the winds can increase in speed rather rapidly. Dust and debris pose an eye hazard. High winds can rip vehicle doors and rear hatches from site personnel's grasp causing damage and injury. Site personnel in the field should select an area or park the vehicle in such a matter that provides a windbreak. If this can not be accomplished, open doors and hatches with care. Vehicles should not be left with doors, hoods or hatches open.

16.5.5.2 **Straight-line/High Winds Safety Rules**

- In a building, move to a pre-designated shelter, such as a basement.
- If a below ground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture. Put as many walls as possible between you and the outside.
- Stay away from windows.
- If caught outside, lie flat in a nearby ditch or depression and cover your head with your hands.
- Be aware of flying debris. Flying debris from tornadoes causes most fatalities and injuries.
- Office trailers, even if tied down, offer little protection from straight-line/high winds. You should leave an office trailer and go to the lowest floor of a sturdy nearby building, or follow the procedures detailed in the 4th bullet above.
- Move to a sturdy building or car. Do not take shelter in small sheds, under isolated trees, or in convertible automobiles.
- If high winds are occurring and a sturdy shelter is not available, get inside a hard top automobile and keep the windows up.

16.5.6 Hail

16.5.6.1 Hail can occur in conjunction with a thunderstorm and can cause damage to equipment and injuries to personnel. Hail occurs when strong rising currents of air within a storm, called updrafts, carry water droplets to a height where freezing occurs. These water droplets become frozen and the ice particles grow in size, becoming too heavy to be supported by the updraft, and fall to the ground. Speeds of the falling ice particles, hail, can exceed 100 miles an hour, with size exceeding that of a softball.

16.5.6.2 **Hail safety Rules**

- Seek shelter, preferably in a building, or hard-top automobile.
- If in the open seek shelter in a culvert if there is no flooding under a rock outcrop or under trees if there is no lightning associated with the hail storm.
- Exercise caution when driving on hail, it is very slippery, so avoid it if at all possible.
- If driving when a hail storm starts pull under an overpass if possible, if not pull well off the road with your lights on in order that advancing motorists can see you.

STANDARD OPERATING PROCEDURE
NUMBER 18

FIRE FIGHTING PLAN

SOP 18 - FIRE FIGHTING PLAN

18.1 PURPOSE

The purpose of this Fire Fighting Plan is to define the general procedures to protect human health and the environment both in the event of a fire at the site.

18.2 SOURCES

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

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

18.3 IMMEDIATE ACTION

18.3.1 Upon detecting a fire/explosion, employees will determine whether the fire is small enough to readily extinguish with immediately available portable extinguishers or water, or if other fire-fighting methods are necessary. Non-essential personnel will be directed away from the area of the fire. If it is judged that a fire is small enough to fight with available extinguishing media, employees will attempt to extinguish the fire provided that:

- They are able to approach the fire from the upwind side, or opposite to the direction of the fire's progress.
- The correct extinguisher is readily available. (Type ABC fire extinguishers will be provided in work areas and on vehicles.)
- No known complicating factors are present, such as the likelihood of rapid spread, imminent risk of explosion, or gross contamination.

18.3.2 Personnel leaving a fire/explosion area will account for all employees in that work area as soon as possible. The SSHO or designee will perform a head count for that work area.

18.4 NOTIFICATION

The SSHO will be notified as soon as possible of the location, size, and nature of the fire/explosion. As conditions dictate, the SSHO will declare an emergency, initiate the remedial procedures, request assistance from the Fire Department by dialing 911, and make the necessary telephone notifications to the USAESCH SS and USAESCH PM.

Outside personnel responding to the fire/explosion may seek assistance from the SSHO with regard to the routing of equipment within the incident site to the most favorable and safe position while minimizing and/or avoiding exposure to any site contaminants.

18.5 RESCUE

If employee(s) are unable to evacuate themselves from a fire/explosion area for any reason, their rescue will be the first priority of responders. The SSHO will determine whether on-site resources are sufficient to proceed, or if rescue must be delayed until the Fire Department responders arrive.

18.6 FIRE PROTECTION

18.6.1 To ensure adequate fire protection, the SSHO will inspect the site to ensure all flammable and combustible materials are being safely stored in appropriately configured storage areas and containers. The SSHO will also ensure that no flammable/combustible materials are stored near any sources of ignition, and that sources of ignition are located a safe distance from storage areas. If needed, storage areas will be segregated from the remainder of the site using flagging.

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

- Potentially explosive/flammable atmospheres involving gases or vapors shall be monitored using a combustible gas indicator.
- Prior to initiation of site activities involving explosive/flammable materials, all potential ignition sources shall be removed or extinguished.
- Non-sparking and explosion-proof equipment shall be used whenever the potential for ignition of flammable/explosive gases/vapors/liquids exists.
- Dilution or induced ventilation may be used to decrease the airborne concentration of explosive/flammable atmospheres.
- Smoking shall be prohibited at, or near, operations that may present a fire hazard, and the area shall be conspicuously posted with signs stating "No Smoking or Open Flame within 50 Feet."
- Flammable and/or combustible liquids must be handled only in approved, properly labeled containers equipped with flash arrestors and self-closing lids.
- Transfer of flammable liquids from one metal container to another shall be done only when the containers are electrically bonded if capacity is greater than 5 gallons; otherwise, the containers are kept in metallic contact.
- The motors of all equipment being fueled shall be shut off during the fueling operations.

- Metal drums used for storing flammable/combustible liquids shall be equipped with self-closing safety faucets, vent bung fittings, grounding cables and drip pans, and shall be stored outside buildings in an area approved by the SSHO.

18.7 DECONTAMINATION

At the conclusion of fire fighting activities, the SSHO will:

- Determine, to the extent practical, the nature of the contaminants encountered during the incident.
- Equipment not easily decontaminated shall be labeled and isolated for further action, such as determining specific contaminants by wipe sampling or awaiting the delivery of specific decontamination media and supplies.

18.8 FIRE EXTINGUISHER INFORMATION

18.8.1 The four classes of fire, along with their constituents, are as follows:

Class A - Wood, cloth, paper, rubber, many plastics, and ordinary combustible materials.
Class B - Flammable liquids, gases, and greases.
Class C - Energized electrical equipment.
Class D - Combustible metals such as magnesium, titanium, sodium, and potassium.

18.8.2 Examples of proper extinguishing agents are as follows:

Class A - Water or ABC Dry Chemical
Class B - ABC Dry Chemical
Class C - ABC Dry Chemical
Class D - Metal-X Dry Chemical (not anticipated and not on-site.)

STANDARD OPERATING PROCEDURE
NUMBER 34

CONVENTIONAL ORDNANCE

SOP 34 - CONVENTIONAL ORDNANCE

34.1 PURPOSE

This Standard Operating Procedure (SOP) provides the procedures and safety and health requirements applicable for the handling and disposal of recovered conventional UXO/MEC.

34.2 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of all field activities associated with this project. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, State, and local regulations. Consult the documents listed in Section 34.3 of this SOP for additional compliance issues.

34.3 REGULATORY REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of demolition/disposal operations:

- CWM Scoping and Security Study, General Work Plan;
- Site Specific Work Plan and SSHP;
- Parsons Corporate Safety and Health Program;
- EM 385-1-97, Explosives Safety and Health Requirements Manual;
- EP 1110-1-17, Establishing a Temporary OB/OD Site for Conventional Ordnance and Explosives Projects;
- EP 1110-1-18, Ordnance and Explosives Response;
- EM 1110-1-4009, Ordnance and Explosives Response;
- USACE EM 385-1-1, Safety and Health Requirements Manual; and
- OE Sector Demolition SOP.

34.4 RESPONSIBILITIES

34.4.1 The Site Manager (SM) will be responsible for assuring that adequate safety measures and coordination between project staff and outside agencies are completed during Evacuation of Non-UXO Personnel and the Handling and Disposal of Recovered Conventional UXO/MEC items.

34.4.2 The Site Safety and health Officer (SSHO) for the site is responsible for ensuring that all site activities, to include intrusive operations and handling and disposal of MEC/UXO items, are being conducted in a safe and compliant manner.

34.4.3 The Senior UXO Supervisor (SUXOS) will be responsible for assuring that adequate safety measures and housekeeping are taken during all intrusive operations, to include handling and disposal of MEC/UXO items, and shall visit demolition locations to ensure that demolition operations are carried out in a safe, clean, efficient, and economical manner.

34.4.4 The UXO Quality Control Specialist (UXOQCS) is responsible for inspecting the Daily Operational Log, the Demolition Shot Record, and the inventory of MEC and demolition material.

34.4.5 All site personnel will strictly adhere to the procedures stipulated in this SOP.

34.5 GENERAL SAFETY REQUIREMENTS

Maximum safety in any MEC operation can be achieved through adherence to applicable safety precautions, a preplanned approach, and intensive supervision. Only those personnel absolutely necessary to the operation shall be allowed in the exclusion zone (EZ) during UXO activities (DOD 6055.09-M). The following precautions must be observed in searching for, probing for, excavating, moving, and handling MEC:

- MEC, which has been exposed to fire and detonation, must be considered extremely hazardous.
- MEC shall not be destroyed until it is positively identified. Carefully examine the item for markings and other identifying features such as shape, size, and external fittings. Do not move the item to inspect it.
- Do not depress plungers; turn vanes; rotate spindles; levers; setting rings; or external fittings on any suspect UXO. These actions may arm; actuate or function the item.
- Assume that "practice" UXO contain live charges until determined otherwise.
- Do not dismantle, strip or subject any MEC to unnecessary movement.
- Do not wear outer or undergarments made of wool, silk, or synthetic textiles such as rayon and nylon while working on MEC. These materials can generate sufficient static charge to ignite fuels or initiate explosives. Any person coming in contact with a MEC item shall ground himself prior to touching it.
- Before any movement of UXO item, the fuze condition must be ascertained. If the condition is questionable, consider the fuze armed. The fuze is considered the most hazardous component of a UXO, regardless of type or condition.
- Do not allow unauthorized or unnecessary personnel to be present in the vicinity of UXO. Limit personnel exposure time. Operations shall always be based upon minimum exposure consistent with efficient operations.

34.6 MUNITION WITH THE GREATEST FRAGMENTATION DISTANCE (MGFD)

A listing of all MEC items reported to be at the site will be listed in the approved project Work Plan, along with the selected Munition(s) with the Greatest Fragmentation Distance (MGFD) and their associated minimum separation distances (MSD). In the event that there are no MEC anticipated or identified at the site, no MGFD will be established.

34.7 EVACUATION OF NON-ESSENTIAL PERSONNEL

34.7.1 Once a MEC item is discovered, the SM and Ordnance and Explosives Safety Specialist (OESS) will conduct the necessary notification to all outside agencies required to affect an orderly evacuation of non-essential personnel. Once complete, the evacuation will be

enforced until the item has been mitigated, transported to another location, or disposed of properly and the residents are no longer impacted.

34.7.2 In the event of a MEC item recovery that is not listed in the approved Work Plan, the item will be positively identified and the site will establish a new MFGD, based on DDESB Technical Paper 16 and/or the appropriate Fragmentation Data Sheet. If the item cannot be positively identified, as to type by function, fuzing and filler, the site will assume the item to be suspect RCWM and request OESS assistance in contacting the local U.S. Army EOD unit, IAW the approved Work Plan.

34.7.3 A suspect RCWM item that has been identified by EOD to be conventional UXO will be returned to the project for disposal. If the EOD unit cannot identify the item, a request for support from the 22d Chemical Battalion (TE) will be made by the OESS. Evacuation for non-essential personnel will be maintained until the hazard is eliminated.

34.8 INTRUSIVE ACTIVITIES

The serious problem exists with the handling and disposal of a recovered MEC item contained in toxic contaminated soils. The Downrange Team will need to be extremely aware of the potential of locating an intact MEC item while conducting soil removal and treatment procedures.

34.8.1 Procedures

In the event that MEC is uncovered during soil removal and treatment procedures, the Downrange Team Leader will:

- Cease operations.
- Notify the Command Post.
- Positively identify the item encountered (ordnance type, fuzing, and filler).
- If any explosive items are recovered during contaminated soil removal operation the following steps will be followed:
    - If the item is determined to be "Acceptable to Move", then under direction of the SSHO, prepare the item for movement, by placing the item inside a double wrap of 6-mil plastic, sealed with tape and outside bag lightly wiped down with decontamination solution.
    - Transfer the item directly over to the SUXOS or UXOQCS at the Hot Line, who will place the item inside a larger 6-mil plastic bag for transport.

- Once the item has been positively identified as "Acceptable to Move" to another location for disposal, the SSHO will request permission from the OESS to be allowed to establish a Temporary Open Burn/Open Detonation Area, IAW EP 1110-1-17.
- If the item cannot be moved, the disposal area will be protected with additional safeguards to stop the spread of contamination and erected IAW HNC-ED-CS-S-98-7, and Amendment 1, Use of Sandbags for Mitigation of Fragment and Blast Effects due to Intentional Detonation of Munitions.
- The SM will notify and coordinate with the local authorities to obtain a suitable disposal area.
- The SUXOS will either draw from established on site explosives or notify the established "On-Call" explosives provider and request the adequate amounts of demolition material needed to dispose of the item(s).
- All demolition operations will be conducted IAW Parsons Demolition SOP.

STANDARD OPERATING PROCEDURE
NUMBER 36

RANGE FIRE AND WILDFIRE OPERATIONS

SOP 36 - RANGE FIRE AND WILDFIRE OPERATIONS

36.1 INTRODUCTION

The purpose of this procedure is to provide the minimum requirements and site personnel actions in the event of Range Fires or Wildfires.

36.2 SCOPE

This SOP applies to all site personnel involved in field operations regardless of affiliation. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

36.3 REFERENCES

Applicable sections and paragraphs in the documents listed below will be used as references for the conduct of Range/Wildfire operations:

- Parsons Corporate Safety and Health Program;
- EM 385-1-97, Explosives Safety and Health Requirements Manual;
- EM 1110-1-4009, Ordnance and Explosive Response; and
- EM 385-1-1, USACE, Safety and Health Requirements Manual.

36.4 RESPONSIBILITIES

36.4.1 Site Manager

Upon notification from UXOSO, the Site Manager (SM) will notify the local public or government Emergency Response element, as described in the Accident Prevention Plan (APP) (Emergency Notification), and relay to both the UXOSO and Parsons PM that those notifications have been made. The SM will remain at the site office and maintain radio communications with the UXOSO. Upon arrival at the site office, the SM will conduct a head count of all site personnel and visitors, using that day's Safety Brief Sign-In Roster and Site Visitors Log as verification of number of personnel present.

36.4.2 Site Supervisory Personnel

Upon notification from UXOSO, supervisory personnel will not assist with fire fighting; they will maintain control of their assigned personnel, assess what mission essential equipment should be evacuated, prepare their remaining personnel for evacuation to the site office and maintain radio communications with the UXOSO.

36.4.3 UXO Safety Officer (UXOSO)

4.3.1 Upon notification that a range fire or wildfire is present in the area, the UXOSO will notify the SM and site personnel by radio or cellular phone. If MEC intrusive operations are

being conducted, either the UXOSO or SUXOS will cease all operations and have the intrusive team return to the site office, by the quickest means possible.

4.3.2 The UXOSO will direct all non-essential site personnel to conduct fire fighting procedures with available fire fighting equipment for those fires that immediately threaten site operations. An attempt to fight the fire will be made with all available fire-fighting equipment on hand. A reasonable decision will be made by the UXOSO when these means are exhausted and any further attempts will endanger site personnel.

4.3.3 All other personnel will secure mission essential equipment and prepare to evacuate the area to the site office. The UXOSO will maintain radio communications with all site supervisory personnel, necessary support elements and maintain on site log of events.

36.4.4 Individual/Personnel Initially Reporting the Fire

The individual or personnel initially reporting a range fire or wildfire will report immediately to either the UXOSO or Team Leader by the quickest means possible. These personnel will not attempt to begin any fire fighting actions or conduct any other notifications. The team leader immediately notifies the SUXOS and UXOSO.

36.4.5 Site Personnel

Upon the notification to evacuate the work site, personnel will do so in an orderly manner. Vehicle operators will not exceed the posted or site enforced speed limit or prudent speeds for road conditions. Site personnel providing fire-fighting support will use the fire extinguishers, as described on the fire extinguishers safe operating label and approach the fire always upwind or crosswind from the fire.

36.4.6 Responding Local Authorities (Police, Fire and Ambulance)

Upon requesting the assistance from local authorities and other support elements, these responding personnel will be met by either UXOSO or SUXOS at a pre-designated location near the fire, outside of the minimum separation distance (MSD) for the Munitions with the Greatest Fragmentation Distance (MGFD), and receive a UXO Safety Brief on the associated MEC items and hazards that may be present. The responders may elect to move back to a safer area and prepare a fire break rather fight the fire directly. Site personnel will assist the local responders as requested.

36.5 EXPLOSIVE STORAGE AREA

As with approaching lightning, no work will be conducted in or near any explosive storage area (ESA) when a range/wildfire threatens this area. All site personnel and any affected residents near the ESA will be evacuated to a distance outside the ESA's approved Inhibited Building Distance (IBD), as stated in the Explosives Siting Plan. At no time will site personnel attempt to fight a range/wildfire that threatens the ESA.

36.6 REMOTE SITE LOCATION(S)

Those site personnel assigned duties within the work site that are considered remote; meaning only one route in or out; excessive distance from the site office; limited communications or extreme terrain features, will report the fire, but not engage in any fire-fighting duties and evacuate, by the safest means possible.

STANDARD OPERATING PROCEDURE
NUMBER 37

MATERIAL POTENTIALLY PRESENTING AN EXPLOSIVE HAZARD INSPECTION, CERTIFICATION, AND FINAL DISPOSITION

SOP 37 – MPPEH INSPECTION, CERTIFICATION, AND FINAL DISPOSITION

37.1 PURPOSE

The U.S. Army Corps of Engineers (USACE) contractors executing projects will comply with the following procedures for processing MPPEH for final disposition. The objective of these procedures is to ensure that an inspection procedure of the exterior and interior surfaces of all recovered MPPEH is in place to ensure these items do not present an explosive hazard. These USACE contractor responsibilities and procedures will be contained, or referenced, in the project work plan. The purpose of this SOP is to standardize the procedures used in the handling, inspection, certification, and final disposition of all: "other debris" (i.e., debris unrelated to munitions or range operations), munitions debris (MD), range-related debris (RRD), and material potentially presenting an explosive hazard (MPPEH), which includes material documented as being safe (MDAS) and material documented as an explosive hazard (MDEH).

37.2 SCOPE

This SOP is applicable to all operations, which are related to the collection, processing and disposition or might involve encountering other debris, MD, RRD, and MPPEH.

37.3 OBJECTIVE

The objective of this SOP is to ensure that an inspection procedure of the exterior and interior surfaces of all recovered MPPEH is in place to ensure these items do not present an explosive hazard.

37.4 REGULATORY REFERENCES

The following references were used in total or in part to develop this SOP:

- DoD Instruction 4140.62, Material Potentially Presenting an Explosive Hazard;
- DoD Directive 4160.21-M, Defense Material Disposition Manual;
- DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards;
- EM 1110-1-4009, Military Munitions Response Actions, and Errata Sheets 1-4;
- EM 385-1-97, Explosives Safety and Health Requirements Manual (including errata sheets);
- 40 CFR 261.6, RCRA Exclusion for Recyclable Scrap Metal; and
- EP 75-1-1, Methods and Procedures for Processing AEDA.

37.5 RESPONSIBILITIES

37.5.1 Unexploded Ordnance (UXO) Sweep Personnel will only mark suspected items and will not be allowed to perform any assessment of a suspect item to determine its status.

37.5.2 Unexploded Ordnance (UXO) Tech I can tentatively identify a located item as MPPEH, followed by a required confirmation by a UXO Tech II or III

37.5.3 UXO Technician II will:

37.5.3.1 Perform a 100% inspection of each item as it is recovered and determine the following:

- Is the item a UXO, a DMM, munitions debris, or range-related debris?
- Does the item contain explosives hazards or other dangerous fillers?
- Does the item require detonation?
- Does the item require demilitarization (demil) or venting to expose dangerous fillers?
- Does the item require draining of engine fluids, illuminating dials and other visible liquid hazardous, toxic or radiological waste (HTRW) materials?

37.5.3.2 Segregate items requiring demil or venting procedures from those items ready for certification.

37.5.3.3 Items found to contain explosives hazards or other dangerous fillers will be processed in accordance with applicable procedures.

37.5.4 UXO Technician III will:

- Perform a 100% re-inspection of all recovered items to determine if free of explosives hazards or other dangerous fillers and engine fluids, illuminating dials and other visible liquid HTRW materials?
- Supervise detonation of items found to contain explosive hazards or other dangerous fillers and venting/demil procedures.
- Supervise the consolidation of MPPEH for containerization and sealing. Munitions Debris and Range-related Debris will be segregated.

37.5.5 UXO Quality Control (QC) Specialist will:

- Conduct daily audits of the procedures used by UXO teams and individuals for processing MPPEH.
- Perform and document random sampling (by pieces, volume or area) of all MPPEH collected from the various teams to ensure no items with explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials are identified as munitions debris or range-related debris as required for completion of the Requisition and Turn-in Document, DD Form 1348-1A.

37.5.6 UXO Site Safety Officer (UXOSO) will:

- Ensure the specific procedures and responsibilities for processing MPPEH for certification as munitions debris or range-related debris specified in the work plan are being followed.
- All procedures for processing MPPEH are being performed safely and consistent with applicable regulations.

37.5.7 Senior UXO Supervisor will:

- Be responsible for ensuring work and Quality Control (QC) Plans specify the procedures and responsibilities for processing MPPEH for final disposition as munitions debris or range-related debris.
- Ensure a Requisition and Turn-in Document, DD Form 1348-1A is completed for all munitions debris and range-related debris to be transferred for final disposition.
- Perform random checks to satisfy that the munitions debris and range -related debris is free from explosive hazards necessary to complete the Form, DD 1348-1A.
- Certify all munitions debris and range-related debris as free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.
- Be responsible for ensuring that inspected debris is secured in a closed, labeled and sealed container and documented as follows;

1. The container will be closed and clearly labeled on the outside with the following information: The first container will be labeled with a unique identification that will start with USACE/Installation Name/Contractor's Name/0001/Seal's unique identification and continue sequentially.
2. The container will be closed in such a manner that a seal must be broken in order to open the container. A seal will bear the same unique identification number as the container or the container will be clearly marked with the seal's identification if different from the container.
3. A documented description of the container will be provide by the contractor with the following information for each container; contents, weight of container; location where munitions or range-related debris was obtained; name of contractor, names of certifying and verifying individuals; unique container identification; and seal identification, if required. The contractor in a separate section of the final report will also provide these documents.

- On projects where this is no USACE OE Safety Specialist, the DD Form 1348-1A verification can be delegated to a UXO Quality Control Officer or a similarly trained individual.

37.5.8 Project Manager

The Parsons Project Manager (PM) is responsible for ensuring that this plan is implemented as written and that all the requisite equipment and material are available to the site manager.

37.6. MPPEH CERTIFICATION AND VERIFICATION

37.6.1 Parsons will ensure that MPPEH is properly inspected in accordance with the procedures above. Only personnel who are qualified UXO personnel will perform these inspections. The SUXOS will certify and the USACE OE Safety Specialist (OESS) will verify that the debris is free of explosive hazards. On projects where there is no USACE OESS, the DD Form 1348-1A verification can be delegated to a UXOQCS or similarly trained individual.

37.6.2 DD form 1348-1A will be used as certification/verification documentation. All DD Form 1348-1A must clearly show the typed or printed names of the Parsons' SUXOS and the

USACE OESS organization, signature, and Parson's home office and field office phone number(s) of the persons certifying and verifying the debris as free of explosive hazards.

37.6.3 Local directives and agreements may supplement these procedures. Coordination with the local concerns will identify any desired or requested supplementation to these procedures.

37.6.4 In addition to the data elements required and any locally agreed to directives, the DD Form 1348-1A must clearly indicate the following for scrap metal:

- Basic material content (Type of metal; e.g., steel or mixed)
- Estimated weight
- Unique identification of each of the containers and seals stated as being turned over.
- Location where munitions debris or range-related debris was obtained.
- Seal identification, if different from the unique identification of the sealed container.

37.6.5 The following certification/verification will be entered on each DD Form 1348-1A for turnover of munitions debris or range-related debris and will be signed by the SUXOS and the USACE OESS. This statement will be used on any ranges where Range-Related Debris is being processed along with munitions debris: "This certifies that the material listed has been 100% properly inspected and, to the best of our knowledge and belief, are free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.

37.6.6 The following certification/verification will be entered on each DD Form1348-1A for turnover of munitions debris and will be signed by the SUXOS on properties where only munitions debris is being processed: "This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related materials."

37.7 MAINTAINING THE CHAIN OF CUSTODY AND FINAL DISPOSITION

37.7.1 Parsons, in coordination with the Corps of Engineers, will arrange for maintaining the chain of custody and final disposition of the certified and verified materials. The certified and verified material will only be released to an organization that will:

- Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chained of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. This will be signed on company letterhead and stating that the contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content.
- Send notification and supporting documentation to Parsons documenting the sealed containers have been smelted and are now only identifiable by their basic content.
- This document will be incorporated by Parsons into the final report as documentation for supporting the final disposition of munitions debris and range-related debris.

- If the chain of custody is broken, the affected MPPEH must undergo a second 100% inspection, a second 100% re-inspection, and be documented to verify its explosives safety status (identified as either munitions debris or range-related debris).

37.7.2 Material that has been documented as safe (MDAS) in no longer considered MPPEH as long as the chain of custody remains intact. A legible copy of inspection, re-inspection, and documentation must accompany the material through final disposition and be maintained for a period of 3 years thereafter.

37.8 MPPEH/MDEH

37.8.1 Material that is still MPPEH after inspection may be released only to a qualified receiver. The following must be accomplished prior to release of the property:

- Ensure that MPPEH that has been documented as hazardous (MDEH) is only transferred or released to those entities that:
    - Have the licenses and permits required to receive, manage, or process the materials.
    - Have technical experts about the known or suspected explosive hazards associated with the MPPEH.
    - Are qualified to receive, manage, and process MPPEH in accordance with DoD Instruction 4140.62.
    - Have personnel who are:
        - Experienced in the management and processing of hazardous materials equivalent to the MPPEH.
        - Trained and experienced in the identification and safe handling of used and unused military and/or any potential explosive hazards that may be associated with the specific MPPEH.
- The receiver must be advised of all of the potential hazards associated with the MPPEH and agree to receive and process the material IAW with DoD Instruction 4141.62.
- All MPPEH shipments over public transportation routes must comply with DoD guidance that implements hazardous material transportation regulations.
- Ensure that chain of custody and accountability records are maintained through final disposition of MPPEH. A legible copy of inspection, re-inspection, and documentation must accompany MPPEH through final disposition and be maintained for a period of 3 years thereafter.

STANDARD OPERATING PROCEDURE

NUMBER **38**

ESTABLISHMENT AND CONTROL OF MEDICAL EVACUATION (MEDEVAC)

SOP 38 – MEDICAL EVACUATIONS

38.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of establishing and conducting MEDEVAC operations.

38.2 SCOPE

This SOP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of MEDEVAC operations. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable Federal, state and local regulations. Consult the documents listed in paragraph 38.3 of this SOP for additional compliance issues.

38.3 REGULATORY REFERENCES

- Life Flight Vectoring/GPS Card
- Life Flight Safety Card
- Approved Site-Specific Safety and Health Plan
- Federal, State and Local Life Flight Regulations

38.4 RESPONSIBILITIES

38.4.1 Project Manager

The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated in plans, procedures and training for sites where this SOP is to be implemented.

38.4.2 Senior UXO Supervisor

The Senior UXO Supervisor (SUXOS) will be responsible for assuring that the Parsons MEDEVAC team carries out their responsibilities in a safe and efficient manner. The SUXOS is responsible for contacting Life Flight and giving the grid coordinates of the landing zone (LZ) and informing the UXOSO of the estimated time of arrival (ETA) of the helicopter. Once Life Flight has been contacted the SUXOS assists the UXOSO as directed.

38.4.3 UXO Safety Officer/Site Safety Manager

The UXOSO is responsible for guiding Life Flight into the LZ and supervising the preparation of the LZ by the Parsons MEDEVAC Team. The UXOSO acts as the on-scene commander and is the sole contact point for the Life Flight helicopter once they are in the air. The UXOSO or another designated Landing Signals Officer guides the helicopter as detailed in this SOP (Para. 38.6) and the Life Flight Vectoring and Safety cards (Attachment 2 and 3).

38.4.4 MEDEVAC Team Members

The Parsons MEDEVAC Team members assist the UXOSO in preparing the LZ and preparing the patient for transport. They report directly to the UXOSO and assist as directed.

38.5 PREPARATION OF THE LANDING ZONE

38.5.1 LZ Selection

When selecting an LZ a number of factors need to be taken into consideration. First and foremost you need to know the type(s) of helicopter that will respond. This information will assist in ensuring the selected LZ is large enough to accommodate the chopper.

38.5.2 LZ Approaches and Exits

Approaches and exits must be free of major obstacles that may interfere with landing or take-offs, such as tall trees, telephone poles, power lines etc. If possible there should be no obstructions greater than 10 meters in height. The rule of thumb for a civilian Life Flight in determining the distance required between the landing point and the high obstruction is 3.4:1. For military helicopters it is 10:1. See the Life Flight Safety Card for an example of the 3.4:1 ratio.

38.5.3 Ground Obstacles

Obstacles on the ground, such as stumps or rocks, should not be more than 1-foot in height on level ground and less on sloping ground.

38.5.4 Gradients

Ground slope has a considerable effect on selecting an LZ. A helicopter cannot land safely on a gradient that is greater than 14 degrees. If the LZ is on a slope the pilot prefers to land in an uphill orientation due to the tail down attitude of the helicopter.

38.5.5 Surface Conditions

Mud, excessive dust and loose debris are considered undesireable surface conditions for helicopters. A water landing is possible if the water is not more than 18 inches in depth and the bottom is firm.

38.5.6 Winds

If the wind exceeds 10 knots the helicopter must land into the wind. There are generally two ways to determine the wind velocity and direction in the absence of a wind gauge. The first is the grass drop method: Hold your arm straight out and drop the grass from your hand. Point your extended arm to the grass on the ground. The angle between the arm and the body is the wind velocity divided by four. The second method is by the use of smoke. Observe the angle at which the smoke blows: if the smoke goes straight up there is no wind; if the smoke blows at a 30 degree angle, wind is 3-5 knots; if the smoke blows at a 60 degree angle, wind is 5-7 knots; and if the smoke blows along the ground, wind exceeds 8 knots. When using smoke inform the pilot of the color of smoke you are using in order to prevent him from proceeding to the wrong area.

38.5.7 LZ Dimensions

The LZ must have a fuselage safe area of stumps, bushes, rocks and other obstacles. A rotor safe circle must be cleared of any obstacle that would interfere with the rotor blades. This is a minimum of 100 feet in daylight and 125 feet at night.

38.6 GUIDING THE HELICOPTER TO AND ONTO THE LZ

The UXOSO guides the helicopter to the LZ by use of grid coordinates, radio communication and in many cases smoke. Whenever possible the grid coordinates of the LZ should be registered with Life

Flight during mobilization. You should establish multiple LZs if the site is large and teams will be spread out over the site. Always have an alternate LZ if possible. By pre-establishing the LZs and communicating their location with Life Flight it saves valuable response time and aids in guiding the helicopter to the LZ.

Once the helicopter has located the LZ the MEDEVAC Team can assist the pilot by guiding him safely into the LZ using arm and hand signals.

One individual trained in the proper use of arm and hand signals for helicopters will be designated as the Landing Signals Officer (LSO). Each signal must be given precisely as shown in the illustrations in order to eliminate confusion (See Attachment 1). At the same time the LSO must be alert for any signals given by the helicopter pilot or co-pilot. During the landing approach the LSOs responsibilities include:

- Inform the helicopter pilot that you are the LSO (Attachment 1, Figure 1). You do this by giving the Prepare For Guidance signal.
- Indicate the landing point to the pilot by positioning yourself 25 meters to the front and 10 meters to the right of the landing point as the pilot looks at the landing point.
- Aid the pilot in landing safely on the landing point by using the arm and hand signals shown below. The pilot is responsible for the approach and landing, however he relies heavily on the signals from the LSO.
- The only signal the pilot must respond to is the Wave-Off signal (Attachment 1, Figure 10), when it is unsafe to land. All other signals are advisory and can either be accepted or rejected by the pilot.
- Give the Take-Off signal (Attachment 1, Figure 9) once the patient is loaded on the helicopter and ground personnel have retreated to the edge of the LZ.

38.7 ATTACHMENTS

Attachment 1 – Illustrated Landing Signals, Figure 1 - 10

Attachment 2 - Life Flight Vectoring in a Helicopter/GPS Navigation Card

Attachment 3 – Life Flight Safety Card

Attachment 1 – Illustrated Landing Signals, Figure 1 - 10

Figure 1 - Prepare for guidance

Figure 2 - Forward

Figure 3 - Backward

Figure 4 - Hover

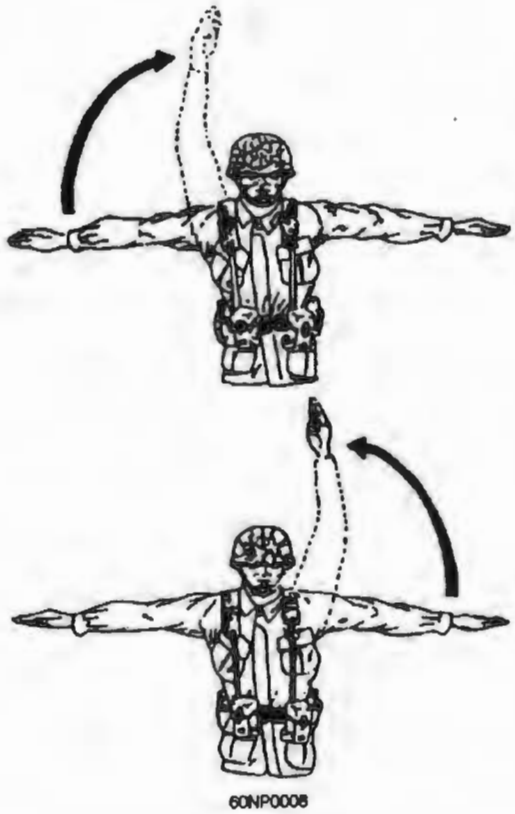


Figure 5 – Move right/left

Figure 6 - Downward

Figure 7 - Land

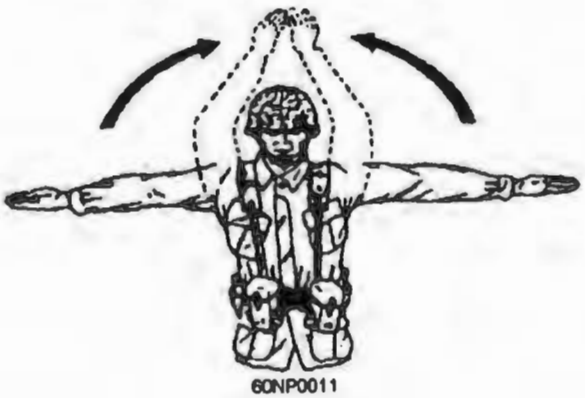


Figure 8 - Upward

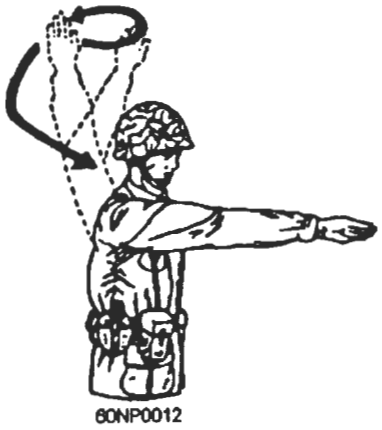


Figure 9 - Takeoff

Figure 10 – Wave-off

Attachment 2 - Life Flight Vectoring in a Helicopter/GPS Navigation Card

Vectoring in a LIFE FLIGHT Helicopter

Remember that both methods used are from the PILOT's perspective.

Clock Method

- Use the hours of the clock to vector the pilot into your landing zone
- 12 o'clock= front of ship
- 3 o'clock= right side of ship
- 6 o'clock= tail of ship
- 9 o'clock= left side of ship

Stop and Turn Method

- Use prominent landmarks to help the pilot locate your position
- Use this method as soon as you see the helicopter
- Notify the pilot as soon as you see the helicopter. Give a turn if needed
- If you make a mistake, immediately give a correction
- If you get confused, just face the general direction the helicopter is traveling and look back over your shoulder. It will help you keep your left and right commands organized in your mind
- As soon as you see or hear the helicopter contact the pilot on your radio

"Turn left/right" Pilots left/right (wait until the helo turns directly towards you)

"Stop turn" (Additional minor corrections may be needed)

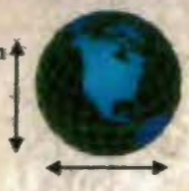
"You are right over head" Don't forget to WAVE your hands so the pilot can see you

Even from the air scenes can be difficult to see especially during the daylight.

LIFE FLIGHT GPS Navigation

801.321.1234 / 1.800.321.1911
www.intermountainlifeflight.org

Latitude
North and South
0°-90°
Based on the equator



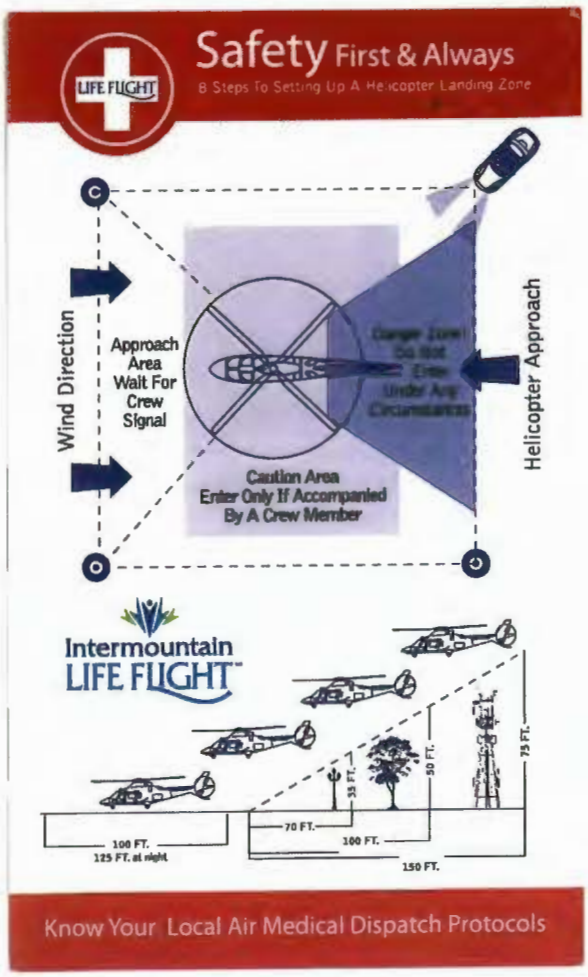
Longitude
East and West
0°-180°
Based on the meridian line Greenwich, England

1. Turn on your GPS system
2. Be familiar with your equipment
3. Allow the unit a clear view of the sky
4. After the GPS has located at least 3 satellites, find the geographical coordinates of your position in degrees, minutes, and decimal minutes.
5. Alert the Life Flight team of your coordinates as soon as possible. The coordinates you give are put into the helicopter's computer system, where distance and time to the arrival will be relayed back to you.
6. The most common way to report the lat/long coordinates of your location are in degrees, minutes, and decimal minutes.

Example of GPS Reporting
WGS 84 Datum

Utah State Capital:
Degrees, Minutes, Decimal Minutes:
N 40° 46.39' W 111° 53.18'
Read as: North 40 degrees, 46 point 39 minutes
West 111 degrees, 53 point 18 minutes

Attachment 3 – Life Flight Safety Card



Life Flight Dispatch

801.321.1234 + 800.321.1911

1. Assign ONE PERSON to communicate with the pilot.

2. Clear the landing zone of debris, people, vehicles, animals etc.

3. Whenever possible avoid loose dirt, dust, sand, powdered snow, etc.

4. Clearly mark the landing zone using cones, smoke, beacons or vehicle lights. Be very careful if using flares.

5. Report wind direction to pilot. Helicopters land & take off into the wind.

6. Landing Zone should be 100 feet x 100 feet, or 125 feet x 125 feet at night.

7. REPORT OBSTRUCTIONS TO PILOT
Avoid obstructions such as WIRES, trees, poles, signs, antennas, etc.
NOTE: Most WIRES cannot be seen from the air.

8. Prepare the landing zone as level as possible (less than 6% grade).

STANDARD OPERATING PROCEDURE

NUMBER 41

EVACUATION PLAN

SOP 41 – EVACUATION PLAN

41.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of evacuations of non-essential personnel from within a safety zone.

41.2 INTRODUCTION

41.2.1 Applicability of Evacuation Process

Evacuation is required when non-essential personnel are within a safety zone. This may occur during three types of scenarios:

1. Non-essential personnel are within the pre-established safety zone used for intrusive excavation of anomalies. Each site area has a safety zone established as part of the Explosives Site Plan. This scenario is classified as a planned evacuation.
2. Non-essential personnel are within the safety zone of an unplanned-for munition identified during intrusive excavation of anomalies. This situation may occur in the unlikely event that a larger munition is identified and the resulting safety zone encompasses non-essential personnel. This scenario is classified as an unplanned evacuation.
3. Non-essential personnel are within the safety zone of a munition within the project area identified as part of project activities other than intrusive investigation of anomalies. This amounts to an unexpected discovery by the project team. This scenario is classified as an unplanned evacuation.

Evacuation will not be required for non-intrusive field operations such as geophysical surveys, surveying, brush clearing, sampling, direct-push work in non-chemical areas conducted with anomaly avoidance, or reacquisition of geophysical anomalies. Landscaping restoration work will also not require evacuation. Evacuations will be required for intrusive investigation of anomalies, suspected disposal pits, and direct push work in suspected chemical areas.

41.2.2 Evacuation Process For Planned Excavations

The process for evacuating non-essential personnel from the safety zone around planned excavations and planned demolition of munitions will consist of notification, evacuation, verification of evacuation, and release from evacuation. The steps for the evacuation process are provided below. A separate process is provided for emergency evacuations (Section 4.8).

41.2.3 Notifications

The nature of planned evacuations will allow sufficient time for a series of notifications to be sent to residents, landowners, and other stakeholders. Such notifications will be in the form of general announcements, letters fliers, emails, door hangers, and knocking on doors.

In addition to the notifications to those residents and landowners directly affected by the evacuation, local officials such as city, county, and law enforcement will also be notified as part

of the general coordination effort. The information conveyed to officials will be the locations of the evacuations, timing, need for road closure and other similar information.

Table 1 provides the general sequence and nature of the notifications to be conducted as part of this process. The following sections describe the timing, content, distribution, and responsibility for each type of notification.

41.2.3.1 *Meeting Announcements*

When: During any public meeting that occurs approximately in the period up to one to two months prior to the planned excavation of anomalies.

Content: The announcement of the general areas and timing of planned excavations should be provided as part of the agenda of these meetings.

Recipients: Meeting attendees, representatives of local governments and agencies who are present, news media in attendance.

Responsibility: The USACE Tulsa and/or Fort Sill should make the announcement. Parsons will assist by providing information on locations and schedule.

41.2.3.1.1 Letter, Email, Flier

When: Approximately two weeks before evacuation is required, letters, emails, and fliers will be distributed.

Content: The letter will contain an explanation for the need for evacuation stressing the necessity for everyone in the area to evacuate. The letter will describe the process including explaining the sequence of geophysical surveys, anomaly reacquisition (placing of flags), and the mag and dig and intrusive investigation of anomalies. It will discuss the areas needing evacuation, planned duration, and the location of a hospitality center, if any. Contact information will be provided for people requiring special needs so they may request assistance (e.g. people in hospice care, people with language or communications problems). Emails will contain the same information as the letters. Fliers will be prepared that identify the areas being evacuated and the timing of the evacuation. Fliers will also be designed for posting in community areas.

Recipients: Letters will be mailed to residents of homes, apartments, townhouses, and businesses within the affected area. Letters will also be mailed to landowners. In addition to a letter, emails will be sent to those affected residents who have provided email addresses. Fliers will be mailed to homeowner's associations, businesses, and other organizations that are in or directly serve the affected areas.

Responsibility: The USACE Tulsa and Fort Sill will have approval authority and will send the letters, emails, and fliers. Parsons will assist by providing the content.

41.2.3.1.2 Door-Hangers

When: Two to three days before the intrusive excavation of anomalies is scheduled in the affected area.

Content: Door-hangers and emails will be used as a reminder of the evacuation and will provide details, such as:

- Dates and hours for the planned evacuation;

- Location of hospitality center;
- Information for people with pets;
- Reminders to reschedule lawn service, in-house appointments, etc.;
- Reminders to notify all occupants about the evacuation;
- Who to contact for help with special needs; and
- Who to contact with any other concerns.

Recipients: Door-hangers will be placed on the front doors of each residence and business within the affected area.

Responsibility: Parsons will provide the content of the door-hangers for approval by USACE Tulsa and Fort Sill. Parsons will place the door-hangers.

41.2.3.1.3 Knock on Door

When: Each residence and business in the affected area will be visited in the morning of each day that intrusive work will be conducted.

Content: The visit will be used to confirm that the occupant has evacuated or will shortly evacuate. Persons conducting the visit will document either no response, or the name of the person answering the door (if given) plus the time and location.

Recipients: All residences and businesses within the affected area.

Responsibility: Parsons will conduct the visits.

41.2.4 Securing the Safety Zone

Parsons field personnel will oversee the withdrawal from the evacuation zone and restrict re-entry during investigation work hours. The Site Safety and Health Officer is responsible for confirming the safety of the evacuation zone. At the beginning of each workday, the assigned personnel will visit each affected residence within the evacuation zone, knock on doors, and look for signs of anyone being present. If any unauthorized persons are determined to be within the evacuation zone, they will be asked to depart and investigation work will not begin until they have left the evacuation zone. The safety personnel will also post signs or erect barriers to close affected streets and walkways to restrict unauthorized entry to the evacuation zone. Personnel will be stationed in appropriate locations outside the evacuation zone to monitor activities continuously during the investigation workday. In the event that unauthorized persons enter or are found within the evacuation zone, investigation activities will be halted until the persons are clear of the area.

If unauthorized persons fail to leave the evacuation zone, law enforcement will be contacted for assistance in clearing the area. If residents or other authorized occupants refuse to leave, intrusive excavation may not proceed.

Table 1
Notifications for Evacuations

Timing (Approx.)	Form of Notification	Recipients	Content	Primary Responsibility
1-2 months prior	Announcements at meetings	Meeting attendees, news media, officials	General intrusive schedule, areas to be covered, expected evacuations	Parsons
2 weeks prior	Letter	Landowners and residents in affected area, officials	Upcoming need for evacuation, dates, areas	Parsons
	Email	Landowners and residents in affected area, officials	Same as letter	Parsons
	Fliers	Homeowner's associations and other organizations within the affected area	Same as letter	Parsons
2-3 days prior	Door-hanger	Residents in affected area	Evacuation need, location of hospitality center, times, contact info	Parsons
Day of intrusive work	Knock on door	Residences and businesses in affected area	Same as door hangers	Parsons

41.2.5 Hospitality Services during Work Hours

Residents within the evacuation zone who are required to evacuate from their residences during the day may use the services provided by the project team hospitality center at a predetermined hotel or other similar facility. A hospitality center will be established depending on work schedules, resident's needs, and availability of space. Specific information regarding hospitality center operational hours and amenities will be provided in the letter mailed out to the affected residents in accordance with the schedule provided above. These services may include refreshments, telephones, television, internet access and other amenities. In the unlikely event that residents are prevented from returning to their homes for the evening, suitable overnight accommodations will be made available to them.

41.2.6 Special Needs

The project team will establish a point of contact to address special needs such as transportation; child care coordination; boarding of pets; assistance with frail, ill, or disabled household members; temporary accommodations for residents who normally conduct business from residence offices; damage to property caused by a detonation at the project site; and other specials needs identified through the community notification efforts. Special needs will be addressed on a case-by-case basis. Identification of special needs in advance is important in the event of unplanned evacuations.

41.2.7 Unplanned Evacuations

As stated above, unplanned evacuations will be required when an unexpected UXO is encountered (larger than the basis for the planned safety zone) or when a UXO is unexpectedly found during non-intrusive activities. These evacuations constitute an emergency and consist of the following activities:

- Evacuation of the (revised) safety zone;
- Notification of Evacuation Requirement;
- Disposal or Mitigation Operations; then
- Notification of All Clear

41.2.8 Evacuation of the Safety Zone

First priority will be to move any non-essential personnel out of the safety zone. Members of the field team will visit each residence or business within the safety zone and tell all occupants that everyone will need to leave the zone. Parsons field personnel will oversee the withdrawal from the evacuation zone and restrict re-entry until the emergency has passed. The occupants will be told of the location of the hospitality center if it is operational. The Site Safety and Health Officer is responsible for confirming the safety of the evacuation zone. The safety personnel will also assist with posting signs or erecting barriers to close affected streets and walkways to restrict unauthorized entry to the evacuation zone. Personnel will be stationed in appropriate locations outside the evacuation zone to monitor entry and egress.

Local law enforcement will be contacted for assistance with blocking roadways and persuading occupants and unauthorized persons who are reluctant to leave. They may also assist with suggesting evacuation routes.

41.2.9 Notification of Evacuation

Notifications in the event of an unplanned evacuation consist of two primary groups: community notifications and notifications within the Army organization. Notice of the need for evacuation will come from the field team through the Ordnance and Explosives Safety Specialist. The initial persons to be notified from the field are local law enforcement and the USACE Project Manager. Subsequent notifications will be conducted from the USACE Project Manager and the Parsons Project Manager to the members of the project team identified in Appendix C, Key Contacts.

41.2.10 Disposal or Mitigation Operations

Once the non-essential personnel have been cleared from the safety zone, operations for the disposal or mitigation of the suspected UXO/CWM can be conducted. Procedures for demolition are provided in Work Plan Appendix F, SOPs. Following the destruction or neutralization of the UXO/CWM, the Parsons Site Safety and Health Officer and the USACE OE Safety Specialist will review the worksite and verify that conditions are safe for return of evacuated persons.

41.2.11 Notification of All Clear

Notification of the all clear for evacuated persons to return will be conducted by the same persons who did the initial notifications. If in use, the hospitality center will be contacted so that all persons can return. Local law enforcement and officials will also be notified.