



Draft

**REVISED OPERATIONS AND MAINTENANCE PLAN
SAND CREEK BARRIER SYSTEM**

**TIME CRITICAL RESPONSE ACTION
ROCKET RIDGE AREA OF OPEN DEMOLITION AREA #2**

**MILITARY MUNITIONS RESPONSE PROGRAM
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO**

Submitted To:

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Abbreviations and Acronyms	
AOC	Area of Concern
APP	Accident Prevention Plan
ARPA	Archaeological Resources Protection Act
BATFE	Bureau of Alcohol, Tobacco, Firearms, and Explosives
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
CRM	Cultural Resources Manager
CWM	Chemical Warfare Materiel
DA	Department of the Army
DDESB	Department of Defense Explosives Safety Board
DoD	Department of Defense
DOT	Department of Transportation
e ² M	engineering-environmental Management, Inc.
EOD	Explosive Ordnance Disposal
EMP	Explosives Management Plan
EP	Engineer Pamphlet
ESP	Explosives Site Plan
H&S	Health and Safety
HARC	Historic, Archeological, and Cultural
HAZWOPER	Hazardous Waste Operations and Emergency Response
HTRW	Hazardous, Toxic, and Radioactive Waste
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
mm	millimeter
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
MSD	Minimum Separation Distance
NAGPRA	Native American Graves Protection and Repatriation Act

Abbreviations and Acronyms (continued)	
NEW	Net Explosive Weight
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
ODA2	Open Demolition Area #2
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PDF	Portable Document Format
PIKA	PIKA International, Inc.
PgM	Program Manager
PM	Project Manager
PO	Purchase Order
QEE	Quarterly Effectiveness Evaluation
QA	Quality Assurance
QAM	Quality Assurance Manager
QAP	Quality Assurance Plan
QC	Quality Control
QCP	Quality Control Plan
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SM	Site Manager
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHASP	Site-Specific Health and Safety Plan
SSHO	Site Safety and Health Officer
SUXOS	Senior Unexploded Ordnance Supervisor
TCRA	Time Critical Response Action

Abbreviations and Acronyms (continued)	
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
WP	Work Plan

I.0 PURPOSE

The purpose of this Operations and Maintenance (O&M) Plan is to establish the work practice standards that will ensure that the Sand Creek Barrier System at the Ravenna Army Ammunition Plant (RVAAP) is properly maintained. This O&M plan includes the activities associated with the inspection and maintenance of the barrier system and the assessment and removal of accumulated materials. This O&M plan has been revised to include all optional MEC related tasks associated with the scope of work; including the required elements of an explosives management plan, explosives site plan, and quality control plan that were not included in the original version of the O&M Plan. Because the purpose of the barrier system is to stop any munitions-related materials that may migrate downstream of the Rocket Ridge Area of the Open Demolition Area #2 (ODA2) munitions response site (MRS) (Army Environmental Database-Restoration Number RVAAP-004-R-01), the O&M field activities will be performed by, or under, the field supervision of an Unexploded Ordnance (UXO) Technician III (UXOTIII) and a UXO Technician II (UXOTII).¹ The barrier system is located approximately 2,700 feet downstream of the Rocket Ridge Area of ODA2 and 40 feet upstream of the George Road Bridge.

¹ UXO Technician III minimum qualification standards: 1) Graduate of a military Explosive Ordnance Disposal (EOD) School of the United States, Canada, Great Britain, Germany, or Australia, or graduate of a formal training course of instruction or EOD assistant courses; 2) Minimum 8 years of EOD/UXO experience; and 3) Prior military EOD and/or commercial UXO experience in munitions response actions or range clearance activities, as appropriate for the contracted operation. (DDESB TP-18)

UXO Technician II minimum qualification standards: 1) Graduate of a military EOD School of the United States, Canada, Great Britain, Germany, or Australia; and 2) Prior military EOD experience OR 1) Graduate of a formal training course of instruction or EOD assistant courses; 2) Minimum 3 years of EOD/UXO experience; and 3) Experience in response munitions response actions or range clearance activities, as appropriate for the contracted operation, plus specific project/explosives safety training. (DDESB TP-18)

2.0 SITE INFORMATION AND HISTORY

RVAAP (Federal Facility Identification number: OH213820736) is located in northeastern Ohio within Portage and Trumbull Counties, approximately three miles east northeast of the city of Ravenna and approximately one mile northwest of the city of Newton Falls. As of February 2006, a total of 20,403 acres of the former 21,683 acre RVAAP have been transferred to the National Guard Bureau (NGB) and have been subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site. The Sand Creek Barrier System is located within the OHARNG acreage, in the central part of the installation, just west of the George Road Bridge and within Sand Creek. Approved personnel/contractors must enter RVAAP through the guarded main entrance on State Route 5 and must coordinate with OHARNG to pass through the unguarded locked gate on George Road.

Rocket Ridge is a steep embankment approximately 500 feet long and 25 feet high located adjacent to Sand Creek within ODA2, approximately 2,700 feet upstream of the George Road Bridge. ODA2 was used for munitions demilitarization, including detonation of large caliber munitions and off-specification bulk explosives that could not be deactivated or demilitarized by any other means. The Rocket Ridge slope was used for the disposal of demilitarized munitions, although not all munitions appear to have been completely demilitarized. Munitions-related items that could be identified include 75-millimeter (mm) and 105-mm rounds, booster cups, three 500-pound bombs, white phosphorus rifle grenades, fuzes, and burster tubes. It appears that the munitions were transported from the demolition site to Rocket Ridge and dumped at the top of the slope. Sand Creek flows in an eastward direction along the northern boundary of the Rocket Ridge Area of ODA2, at the toe of the slope. Due to the steep slope of the disposal area and the stream bank erosion resulting from high water events, some of the munitions materials have reached Sand Creek.

On 18 June 2007, a rifle grenade containing white phosphorus exploded on the slope of Rocket Ridge. The Incident Report attributes the cause of the explosion to a corroded white phosphorus grenade that might have been overturned by an animal, exposing the white phosphorus to air resulting in its auto-igniting, which heated the grenade until the internal burster exploded. No injuries resulted from the incident.

In order to prevent the downstream movement of munitions and explosives of concern (MEC) within Sand Creek, the Army constructed a barrier system. The system consists of two steel wire screen

barriers installed across Sand Creek approximately 2,700 feet downstream of Rocket Ridge and 40 feet upstream of George Road Bridge. The barrier location is downstream of the farthest visible piece of munitions-related material that may have migrated from Rocket Ridge. A survey conducted on 5-6 November 2007 upstream of the George Road Bridge identified a piece of munitions debris (MD) approximately 1,200 feet downstream of Rocket Ridge. Thirteen additional magnetometer anomalies from buried sources were found in the stream between the piece of MD and the location of the barrier system. The sources of these subsurface anomalies have not been investigated.

3.0 OPERATIONS AND MAINTENANCE – TECHNICAL MANAGEMENT PLAN

3.1 Introduction

The Operation and Maintenance (O&M) activities consist of inspecting and removing debris accumulated on the screens and assessing the integrity of the construction. The O&M field team will include at least one UXO Technician III (UXOTIII) and one UXO Technician II (UXOTII).

This section of the O&M Plan addresses the specific field-level approach and procedures that PIKA International, Inc. (PIKA) will employ during O&M field activities at RVAAP.

3.2 Guidance, Regulations, and Policy

The work conducted under this scope of work (SOW) will be performed within the relevant requirements presented in Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) standards found in the 29 Code of Federal Regulations (CFR) 1910.120, 29 CFR 1926.95, the U.S. Army Corps of Engineers (USACE) Engineer Pamphlet (EP) 75-1-2, *Munitions and Explosives Of Concern (MEC) Support During Hazardous, Toxic, And Radioactive Waste (HTRW) And Construction Activities*, dated 01 August 2004, and other relevant Department of the Army (DA) and Department of Defense (DoD) requirements regarding personnel, equipment, and procedures.

3.3 Recovered Chemical Warfare Materiel

Historical data indicates that no chemical warfare materiel (CWM) has been used at the RVAAP. In the highly unlikely event that any potential source of CWM is encountered, PIKA personnel will evacuate the area in an upwind direction to a safe location and await further instruction. The UXO Team Leader will notify the RVAAP Facility Manager will request assistance from military Explosives Ordnance Disposal (EOD). While awaiting military EOD support, PIKA will place a team consisting of at least two UXO personnel to secure the area to prevent unauthorized access. The personnel will position themselves as far upwind as possible while still maintaining observation and security of the area. Once the site is secured, PIKA personnel will continue to secure the site until relieved by military EOD. Confirmation of CWM will require a halt in specific Area of Concern (AOC) operations until the potential for future exposure can be assessed and the Site-Specific Health and Safety Plan (SSHASP) is modified.

3.4 Project Site Layout

PIKA has been contracted to provide O&M Field Activities described in this O&M Plan and SSHASP. The UXO Team will be comprised of a UXOTIII and a UXOTII for the O&M Field Activities. PIKA will accomplish these tasks as described in the following paragraphs.

3.5 Operation and Maintenance Field Activities

The O&M activities at the Sand Creek Barrier System are focused on the following (see Subsection 3.13 for a detailed description of field activities):

- a. Inspecting and removing the debris accumulated on the screen and assessing the integrity of the construction. This will be on a monthly basis;
- b. Inspecting and documenting munitions-related materials that may be present on the screens;
- c. Management of munitions debris (MD) (contract option item to be exercised if MD is found at the barrier System); and
- d. Management of Munitions and Explosives of Concern (MEC) (contract option item to be exercised if MEC is found at the barrier System).

3.6 Management Roles and Responsibilities

With the exception of PIKA's personnel listed below refer to the e²M and PIKA SSHASP for the overall management roles and responsibilities.

3.6.1 Program Manager

Mr. Shahrukh Kanga, CHMM of PIKA is the Program Manager (PgM) for this project. Mr. Kanga will manage the PIKA resources needed for site operations and is responsible for the overall implementation of the project and budgeting. Mr. Kanga has over 15 years of technical and management experience with environmental, radiological and explosive remediation projects.

3.6.2 Project Manager

Mr. Brian Stockwell is the Project Manager (PM) for this project. Mr. Stockwell has substantial experience in the management of environmental remediation projects and will have the following responsibilities:

- Managing the funding, manpower, and equipment necessary to conduct site operations.
- Acting as the point of contact (POC) for communicating with the e²M PM.
- Overseeing the overall performance of all PIKA individuals assigned to the project.
- Reviewing the SOW and ensuring that necessary elements are addressed in project plans.
- Coordinating all contract and subcontract work and controlling costs and schedules.

3.6.3 Corporate Safety and Health Manager

Mr. Drew Bryson, CIH MPH is the PIKA Corporate Safety and Health Manager (CSHM). Mr. Bryson is a board certified industrial hygienist (CIH) with over 17 years of industrial hygiene, safety, and hazardous waste experience, including over 15 years experience working on projects with MEC contamination. During this project, Mr. Bryson will provide occupational safety and health management duties as presented in detail in the Accident Prevention Plan (APP) for this project.

3.6.4 UXO Team Leader

The UXO Team Leader is also a UXO Technician III and controls operations of all MEC activities while reporting directly to the PIKA PM. His responsibilities include implementing the approved plans in the field as well as performing subsequent reviews and approving any changes. The UXO Team Leader supervises all UXO personnel on the project. The UXO Team Leader is authorized to temporarily stop work to correct an unsafe condition or procedure. Has the final on site authority on MEC procedures and safety issues. The UXO Team Leader will meet or exceed the requirements for that position as presented in the DoD Explosives Safety Board (DDESB) approved “UXO Personnel Training and Experience Hierarchy” found in *Technical Paper Number 18 – Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel*, 2004.

3.6.5 Corporate UXO Quality Control Specialist

Mr. Scott Wardle is the PIKA Corporate UXO Quality Control Specialist (UXOQCS). The UXOQCS will have the responsibility of ensuring that all site deliverables meet the requirements of the SOW. Additionally he will perform on site audits of MEC procedures. The UXOQCS will not be on site full time.

Table 3-1: Key PIKA Project Personnel

Title/Name	Responsibilities
Program Manager (PgM) <i>Shahrukh Kanga, CHMM</i>	<ul style="list-style-type: none"> - Ensures resources are available - Responsible Project Budget - O&M Plan/APP Review - Conflict Resolution/Stop Work
Project Manager (PM) <i>Brian Stockwell</i>	<ul style="list-style-type: none"> - Resolve Regulatory-Level Issues - Work Plan preparation - APP Review - Notification - Conflict Resolution/Stop Work
Corporate Safety and Health Manager (CSHM) <i>Drew Bryson, CIH MPH</i>	<ul style="list-style-type: none"> - APP Preparation and Approval - APP Review and Implementation Audits - APP Modification/Deviation Recommendation - Conduct/assist with site, task & hazard specific training - Conflict Resolution/Stop Work
UXOT III (Team Leader) <i>TBD</i>	<ul style="list-style-type: none"> - APP/SSHASP Review - APP/SSHASP & Work Plan implementation - Notification - Conflict resolution/stop work
Corporate UXO Quality Control Specialist (UXOQCS) <i>Scott Wardle</i>	<ul style="list-style-type: none"> - APP & O&M Plan Implementation - Documentation/Reporting - Site Inspections - Safety Inspection - Accident Prevention - Conflict Resolution/Stop Work
Field Personnel <i>TBD</i>	<ul style="list-style-type: none"> - APP Adherence - Accident Prevention

3.7 Mobilization and Site Preparation

3.7.1 Preliminary Activities

PIKA will schedule the arrival of the work force in a manner designed to facilitate immediate productivity. All PIKA personnel mobilized to the site will meet requirements for Occupational Safety and Health Administration (OSHA), and training and medical surveillance requirements as specified in the APP.

During the mobilization, the on-site activities will include:

- Mobilization of the equipment and supplies required to meet the SOW.
- Contact and coordination with the PIKA PM to ensure availability with local fire, medical, and other emergency services in accordance with the O&M Plan and SSHASP.
- Inspection of each work area to identify possible environmental constraints, terrain limitations, and other interferences.

3.7.2 Site-Specific Training

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

- Field equipment operation, including the safety and health precautions, field inspection and maintenance procedures that will be used.
- Interpretation of relevant sections of this O&M Plan and SSHASP as they relate to the tasks being performed.
- Personnel awareness of potential site and operational hazards associated with site-specific tasks and operations.
- Environmental concerns and sensitivity including endangered/threatened species and historic, archeological, and cultural (HARC) issues.
- Additional OSHA required training as required by the SSHASP.
- Identification features, hazards, and reporting procedures if ordnance is encountered.

3.7.3 Equipment

All equipment will be inspected as it arrives to ensure it is in proper working condition. Any equipment found damaged or defective will be repaired or returned to the point of origin, and a replacement will be secured. All instruments and equipment that require routine maintenance and/or calibration will be checked initially upon its arrival and then checked again prior to its use each day. This system of checks

ensures that the equipment is functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service. A request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

As part of the initial equipment set-up and testing, PIKA will also test its communication equipment that includes the following:

- Security Band Radios;
- Hand-held portable radios; and
- Cellular telephones.

3.7.4 Work Zone Set Up

If MEC is identified at the Sand Creek Barrier System, work zones will be set up according to the attached MEC SSHASP.

3.8 Minimum Separation Distances (if MEC is found at the Barrier System)

On all MEC project sites where MEC operations are conducted, the Minimum Separation Distance (MSD), or exclusion zone, will be determined based on the Munitions with the Greatest Fragmentation Distance (MGFD). The distance listed in **Table 3-2** below will be followed during the O&M Field Activities of inspecting and removing the debris accumulated on the screen and assessing the integrity of the construction and for all activities regarding the storage and disposal of MEC and MD found on the screen.

Table 3-2: Minimum Separation Distances (MSDs)

Area		MSD (ft) ¹				
		For Unintentional Detonations		For Intentional Detonations		
Rocket Ridge area of the ODA2 Sand Creek Barrier	MEC	Team Separation Distance (K40)	Hazardous Fragment Distance (HFD)	Without Engineering Controls	Using Sandbag Mitigation	Using Water Mitigation Carboys/Pool
RVAAP	500 lb Bomb M64A1 ²	293	680	2501	NA	NA

Notes:

1. See Figure 2 for calculation sheets and documentation of MSD.
2. Denotes MGFD during intrusive operation within the area indicated.

3.9 MSD for intentional Detonations

The MSD for all intentional detonations will be 2,501 feet as listed in **Table 3-2**.

3.10 Project Notifications

3.10.1 MEC Notifications

Prior to initiating any disposal activities at RVAAP, PIKA will submit the MEC Demolition/Disposal Notification to the Ohio EPA, as provided in the MEC Notification Procedure dated March 8, 2005, and included as Attachment 3 of this O&M Plan.

3.10.2 Emergency Response and General Notifications

At least one week prior to the initiation of MEC disposal operations at RVAAP, PIKA will contact all local emergency services to verify the availability of requisite services and to confirm the means used to summon the services. General notifications will be made to key project personnel at this time as well. This includes the following contacts:

- RVAAP Security Dispatcher (Post 1) – (330)-358-2017
- Ravenna City Fire Department – (330) 296-5783
- Ravenna Police Department – (330) 297-6486
- RVAAP Caretaker Contractor (PIKA) – (330) 358-3005
- Hospital – Robinson Memorial Hospital – (330) 297-0811
- Police – Portage County Sheriff Office – (330) 296-5100
- Police – Trumbull County Sheriff Office – (330) 675-2508
- Ohio State Patrol – (330) 297-1441
- William O'Donnell – BRACO Project Manager – (703) 601-1570
- Mark Patterson – RVAAP COR Facility Manager – (330) 358-7311
- Chris Williams – Akron Regional Air Quality Management District – (330) 375-2480
- Ohio EPA – Eileen Mohr – (330) 963-1221
- OHARNG – MAJ Meade – (614) 336-6790
- e2M – Daniel Zugris – (703) 505-7023

3.11 Statistical Sampling

No statistical sampling will be performed during these activities

3.12 Procedures for Reports and Disposition of MEC

3.12.1 Record Keeping/Accountability

During the optional tasks covered in this O&M Plan, the UXO Team Leader will maintain a MEC Acquisition and Accountability Log contained in Attachment 2 that records the type, quantity, and condition of MEC from discovery to disposal. He/she will also maintain the Demolition Shot Log contained in Attachment 2, which certifies when MEC-related materials are explosively safe.

3.12.2 MEC Safety

Safety is the primary concern during efforts to avoid MEC. All personnel engaged in these efforts will adhere to the SSHASP and the following additional safety requirements: EP 385-1-95a, *Basic Safety Concepts and Considerations for Ordnance and Explosives Operations*, dated 27 August, and EP 75-1-2 *Munitions and Explosives of Concern (MEC) Support During Hazards , Toxic, and Radioactive Waste (HTRW) and Construction Activities*, dated 01 August 04.

3.12.3 MEC Transportation

Transportation of MEC will be done in a specially-equipped pickup truck. The truck must have the appropriate placards and a non-sparking bed liner and tie-down points. The MEC will be stabilized with sandbags or placed in a wooden box filled with sand and securely tied down. The driver of the transport vehicle will be followed by another similar vehicle and driver to assist him in loading and unloading the MEC, and in the event of mechanical trouble. PIKA's Safe Vehicle Operation Standard Operating Procedure (SOP) is contained in Attachment I.

3.12.4 MEC Safe Holding Areas

Safe holding areas will not be used during this project. All items will be taken from the earth covered magazines and transported to ODA2 for disposal.

3.12.5 Collection Points

Collection points are those areas used to temporarily accumulate MEC within an area pending transportation to the approved storage location at Igloo 1502 or ODA2. Collection points will be established in each area during the visual inspection for MEC. Since the collection points will be inside the boundary for the MCE the same MSD for the inspection area will apply to the collection points.

3.12.6 Demolition Procedures

As an optional task PIKA will be responsible for the safe and effective disposal of all recovered MEC at RVAAP. Demolition operations will be coordinated by the SUXOS and will be conducted IAW the procedures outlined in TM 60A-1-1-31, EP 385-1-95a, *Basic Concepts and Considerations for Ordnance and Explosives Operations*, and PIKA's MEC Demolition Standard Operating Procedures Demolition procedures are in the PIKA SOP located in Appendix XX. If a smaller MEC item is identified, demolition

operations will be conducted using sandbag mitigation in accordance with (IAW) HNC-ED-CS-S-98-7, August 1998 and the DDESB Fragmentation Database if permitted in the publications.

MEC demolition will be conducted IAW the procedures outlined in the following paragraphs.

3.12.7 Surface Demolition

Planned detonation of explosives requires more stringent safety distance requirements than those for ordnance in storage. During disposal of MEC, safety is the primary concern. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, and fragmentation. Physical control of the on-site disposal operations will be accomplished by blocking access roads to the site at the point of the MSD.

Control of the disposal operations must be maintained to ensure no unauthorized access of the site by non-essential personnel. During disposal preparation, all nonessential personnel will be evacuated to locations outside the MSD, and all essential personnel will be evacuated outside the MSD prior to initiation of demolition charges.

The SUXOS will ensure that all pertinent parties have been notified of an impending demolition shot. Notification contact numbers are contained in Section 3.11.2.

An established demolition site will be located within ODA2 at RVAAP. See Figure 4 of the Explosives Site Plan (ESP) for location of ODA2 within the RVAAP. Prior to use of this area, PIKA will obtain approval from the RVAAP Acting Facility Manager, Ohio EPA, and Army Safety. The MSD for intentional surface detonation will be the Maximum Fragment Range or K328, whichever is greater.

The MEC that has been discovered at the Rocket Ridge Area of Open Demolition Area #2, which is located approximately 2,700 feet upstream of the Sand Creek Barrier System, is 75-millimeter (mm) and 105-mm projectiles, booster cups, three 500-pound bombs, white phosphorus rifle grenades, fuzes, and burster tubes. The MGFD identified is the 500-pound Bomb M64A1. During the O&M activities, if MEC with a greater fragmentation distance is encountered, the MSD will be adjusted in accordance with DDESB Technical Paper 16. The MSD of 2,501 feet will be used as listed in **Table 3-2**.

3.12.8 Inspection and Certification of MD and non-MD

All collected scrap metal will be 100 percent inspected for absence of explosive materials and secured in lockable containers. All metals will undergo the inspection/certification process described below.

1. UXO Technician IIs will perform a 100 percent inspection each item and determine if the item contains explosive hazards. They will then segregate items that require re-shooting from those items ready for certification.
2. UXO Technician IIIs will perform a 100 percent re-inspection of all recovered items to determine if free of explosives hazards.
3. UXOQCS will conduct daily audits of the procedures used by UXO teams and individuals for processing MPPEH. Perform 10 percent random sampling of all MPPEH collected to ensure that no items with explosive hazards exist as required for completion of the Requisition and Turn-in Document, DD Form 1348-1A. Additionally, the UXOQCS will verify that the MPPEH inspection process has been followed.
4. The SUXOS will perform a 100 percent re-inspection of all recovered items and complete a Requisition and Turn-in Document, DD Form 1348-1A for all MD to be transferred for final disposition. The following certification/verification will be entered on each DD Form 1348-1A:

"This certifies and verifies that Munitions Debris and/or Explosive Contaminated Property listed has been 100 percent properly inspected and to the best of our knowledge and belief, are free of explosive hazards"

The SUXOS will sign as the certifier and the UXOQCS will sign as the verifier. The form will be properly annotated with the following declaration and accompany the shipment.

3.12.9 Disposition of Munitions Debris

MEC and MD scrap metal will be disposed of at a recycler where the material will be processed through a smelter prior to resale. PIKA will document the transport and transfer of the MEC scrap using the chain of custody process in place.

3.13 O&M Field Activities

Each O&M trip will include the following activities:

- Prior to the trip, contact RVAAP Facility Manager, Mr. Mark Patterson, the OHARNG representative, Ms. Katie Elgin, and the Ohio EPA representative, Ms. Eileen Mohr (their contact information is included in Table 3-5). Schedule the date of the O&M trip and confirm access through the George Road gate.
- Access the barrier site from the George Road Bridge and inspect the materials accumulated on the screens. Take a minimum of two digital photographs of each barrier at arrival.

- If human remains or artifacts are observed on the screens, follow the procedures in **Table 3-3** on the following page.

Table 3-3: Procedures for Inadvertent Discovery of Cultural Materials

<p>Contact(s): Kim Ludt, Cultural Resources Manager (CRM), 614-336-6569 (Alternate contact, RTLS Environmental Office, 614-336-6568/6136) (Ravenna Training and Logistics Site [RTLS] Range Control 614-336-6562/6793/6041)</p> <p>Scope: This SOP outlines the steps to be taken upon inadvertent discovery of cultural resources. It is intended for all personnel.</p>
<p>Statutory Reference(s):</p> <p>Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulation (43 CFR 10) Archaeological Resources Protection Act (ARPA) National Historic Preservation Act (NHPA) and its implementing regulation (36 CFR 800).</p>
<p>Procedures: In the event that artifacts or human remains are encountered in or near the stream barrier on Sand Creek, either by the contractor performing maintenance on the barrier, or by other personnel observing the barrier, the following steps should be followed.</p> <ul style="list-style-type: none">• Report any observations or discoveries of artifacts or human remains immediately to the CRM/Environmental Office. If the CRM is not available, report the discovery to Range Control.• The CRM or Range Control will collect or secure any artifacts or remains identified in the stream barrier for analysis or curation, as appropriate. Human remains are not to be disturbed or removed from the barrier.• The CRM will examine the stream banks immediately upstream of the barrier to determine whether an archaeological deposit or human burial has been exposed within the stream bank, and will take measures to protect the location from further erosion or disturbance.• If human remains are known or suspected to be present, the CRM or Range Control will also promptly notify the state police or Federal Bureau of Investigation, as appropriate.• The CRM will promptly notify the Ohio Historic Preservation Office (OHPO) of the discovery. The CRM will follow NAGPRA and ARPA procedures to contact Native American tribes and any other stakeholders, as appropriate.• If a site area or burial is identified as the source of the materials found in the stream barrier, the CRM will make arrangements for site recordation and stabilization, in consultation with the OHPO and any interested Native American tribes.

- If no munitions-related materials are found at the screens, remove all leaf litter and woody debris and place it high on the banks of the stream. When necessary, use a chainsaw to cut larger woody debris into pieces. If, after several O&M trips, the debris pile becomes significant, as determined by OHARNG, use a wood chipper to reduce the volume of material and spread the resulting mulch on the land above the creek banks.

- If munitions-related materials are found, notify the Facility Manager and propose the steps to be taken. Do not initiate any work on the munitions-related materials until receiving written approval from the Facility Manager or its designees. Also, for informational purposes only, notify OHARNG that munitions-related materials were found at the screens. **Table 3-4** below is a guide of potential management alternatives:

Table 3-4: Management Alternatives for Munitions-Related Materials

Type of Munitions Material Found	Potential Action
Munitions Debris	Store at an onsite designated location until it can be destroyed at ODA2 (must follow Ohio EPA MEC Notification Procedures in Attachment 3)
	Ship offsite to permitted scrap metal recycling facility (requires filling out Form DD 1348-1A and Chain of Custody Form)
MEC that can be safely moved	Store at onsite designated location (in accordance with current security requirements) until it can be destroyed at ODA2 (must follow Ohio EPA MEC Notification Procedures in Attachment 3)
	Move directly to ODA2 and destroy (must follow Ohio EPA MEC Notification Procedures in Attachment 3)
MEC that cannot be safely moved from the Sand Creek Barrier System area	Blow in place (must follow Ohio EPA MEC Notification Procedures in Attachment 3)

- If munitions-related materials are found on the screens, take a minimum of ten digital photographs to document their condition and to support the management option implemented.
- Take a minimum of two digital photographs of each barrier after the removal of accumulated debris.
- PIKA will be prepared to complete small repairs and adjustments (e.g., loose or missing bolts, post caps, etc.) during the O&M trip. More extensive repairs, such as replacing a screen panel or a post, will be completed within two calendar weeks of the trip date. Spare barrier components, such as screen panels and posts, will be available at RVAAP.
- Following the trip, prepare a brief trip report to document field activities. The report will include a description of the debris inspection and removal activities, barrier integrity, an assessment of any changes in barrier condition since the previous trip, any repairs made or needed to be made, copies of any forms or documents generated as a result of the field trip findings, and photographs. The trip report will be submitted to the recipients listed in **Table 3-5** within seven calendar days of the completion of the field trip or of the completion of the

barrier system repairs (if performed). The submittal will be in print and in electronic form (Adobe Acrobat Portable Document Format [PDF]).

Table 3-5: Recipient List for Barrier System O&M Submittals

<p>Mark Patterson Facility Manager Ravenna Army Ammunition Plant 8451 State Route 5 Ravenna, OH 44266-9297 Telephone: 330-358-7311 E-mail: mark.c.patterson@us.army.mil</p>	<p>Eileen Mohr Project Manager Ohio Environmental Protection Agency Division of Emergency and Remedial Response 2110 East Aurora Road Twinsburg, OH 44087 Telephone: 330-963-1221 E-mail: eileen.mohr@epa.state.oh.us</p>
<p>Mark Krivansky Environmental Restoration Manager US Army Environmental Command E4480 Beal Road Aberdeen Proving Ground, MD 21010-5401 Telephone: 410-436-0542 Facsimile: 410-436-1548 E-mail: mark.krivansky@us.army.mil</p>	<p>Terry Samson USACE Project Manager U.S. Army Corps of Engineers, Omaha District 106 South 15th Street Omaha, NE 68102 Phone: 402-221-7171 Fax: 402-221-7796 E-mail: terry.l.samson@usace.army.mil</p>
<p>Katie Elgin Environmental Specialist 2 OHARNG -RTLS Ravenna Training and Logistics Site 1438 State Route 534 SW Newton Falls, Ohio 44444 Telephone: 614-336-6136 E-mail: katie.elgin@us.army.mil</p>	<p>Daniel Zugris Technical Program Manager e²M 2751 Prosperity Avenue, Suite 200 Fairfax, VA 22031 Telephone: 703-752-7755 (ext. 126) Facsimile: 703-752-7754 E-mail: dzugris@e2m.net</p>

3.14 O&M Field Trip Frequency

PIKA will conduct 12 O&M field trips during the first O&M calendar year (this number may be adjusted during the second O&M year based on the experience gained in the first year). It appears reasonable to correlate the frequency of the O&M trips with the regional monthly precipitation rate, since the amount of debris accumulated on the screens is a function of the amount of water flowing in the creek as well as the season. This rationale could be used to develop a calendar-based schedule. It is also reasonable to assume that there will occasionally be intense rain events with high debris potential that are not captured in the average monthly precipitation data. This type of rain event would require a flexible, non

calendar-based, schedule. A combination of the two rationales may provide a suitable scheduling tool for the Sand Creek Barrier System:

- One O&M trip per month will be conducted during the eight calendar months with precipitation averages over three inches. According to the National Oceanic and Atmospheric Administration (NOAA) precipitation data for Akron, Ohio, shown in **Table 3-6** (<http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/nrmlprcp.html>), these months are March, April, May, June, July, August, September, and November.

Table 3-6: Normal Monthly Precipitation (Inches) for Akron, OH, between 1971 and 2000

AKRON,OH	YEARS	JAN	FEB	MAR	APR	MAY	JUN
	30	2.49	2.28	3.15	3.39	3.96	3.55
	ANNUAL	JUL	AUG	SEP	OCT	NOV	DEC
	38.47	4.02	3.65	3.43	2.53	3.04	2.98

- Four additional O&M trips will be set aside for trips following intense rain events or flooding, or when OHARNG personnel driving over George Road Bridge observe a significant debris accumulation on the screens. In these cases, e²M will be contacted by the USACE Omaha District, and required to conduct an O&M trip outside of the monthly scheduled events. The PIKA will mobilize to the site within seven calendar days of the request. The organizations that may trigger one of the additional trips include RVAAP, OHARNG, Ohio EPA, USAEC, and USACE. Prior to the request being transmitted to USACE Omaha District, the organization requesting the trip will consult with RVAAP and OHARNG to reach agreement.

3.15 Quarterly Effectiveness Evaluation Report

Within two calendar weeks of the completion of a three-month period of O&M activities, e²M will submit a Quarterly Effectiveness Evaluation (QEE) Report. This report will include a summary of the routine and unique O&M activities performed within the previous quarter and an assessment of whether the barrier system has functioned as intended. If warranted, the QEE Report will include recommendations for addressing any schedule, coordination, reporting, O&M field work, or construction shortcomings.

3.16 Safety and Health Plan

PIKA has submitted a Site Specific Safety and Health Plan (SSHASP) for the O&M activities under separate correspondence to the recipients listed in Table 3-5. The SSHASP Plan covers all on-site work

specified in **Subsection 3.1** of this document. PIKA will have a copy of the approved SSHASP available every time O&M activities are performed on site.

4.0 EXPLOSIVES MANAGEMENT PLAN

4.1 General

The performance of MEC management is an optional contract task that will be exercised if MEC is identified at the Barrier System. The measures defined in this Explosive Management Plan (EMP) are applicable to all PIKA employees, clients, and visitors entering any MEC-contaminated work site where explosives, MEC, or related material and demolition materials are being handled on site.

During explosive operations, safety is the primary concern. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, fragmentation, and toxic releases. Proper inspection, handling, packaging, and inventory control are all tasks that must be considered to conduct a safe and efficient operation.

The procedures detailed in this plan were developed to assure safe and efficient MEC and demolition material handling operations are conducted at this project. Absence of a written safety requirement does not indicate that safeguards are not required.

Each individual authorized to receive, issue, transport, and use explosives will be identified by name and assume accountability when signing receipt or transfer documents.

At the project site, any licenses or permits required to purchase, conduct operations, or transport explosives will be on hand and made available to federal, state, or local agencies upon request.

All transactions relating to explosive material acquisition and expenditures of explosive materials will be maintained for a period of five (5) years. Records will be maintained at the project office during on-site operations and subsequently moved to the offices of the Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATFE) license holder's (PIKA's) business offices in Stafford, Texas.

4.2 Acquisition

PIKA will utilize both jet perforators and detonation cord along with electric detonators for demolition shots to control the operation and reduce the net explosive weight (NEW) to be used. PIKA uses Department of Transportation (DOT) Class 1.4 explosives whenever possible, which are safer to handle, easier and less expensive to ship and store and more readily available. The demolition materials anticipated for use at RVAAP are presented in **Table 4-1**.

The types and estimated quantities of explosives and their intended use during the project may be revised as work progresses, but typically the following explosives will be used during explosive disposal of MEC:

Table 4-1: Demolition Materials for Use at RVAAP

Description	Estimated Quantity	DOT Hazard Class	Net Explosive Weight	UN NO.
Det Cord, 80 grain	2000 ft.	1.4D	27.8 pounds	UN0289
Perforator 19 gram	1200 ea	1.4S	61.08 pounds	UN0441
Electric detonators	50 ea	1.4 B	3.3 pounds	UN0267
1 lb Boosters	10	1.4S	10 pounds	UN0208

All explosives are expected to be purchased through commercial suppliers in Ohio, with no government furnished explosives anticipated. The items listed above will be transported as needed in various shipments. The approved NEW for the magazines will not be exceeded during PIKA's activities.

Explosives are purchased under PIKA's "User of High Explosives License" issued by the BATFE. PIKA must provide written authorization designating the individuals authorized to purchase, store, or use explosives. A copy of this letter will be maintained at the project office and will reflect:

- Name of individual,
- Home address,
- Date and place of birth, and
- Social Security number.

Individuals authorized to purchase explosives will have a blaster's license issued by the state in which the project is located, if required. The PIKA PM and SUXOS will be responsible for identifying the need to obtain the license and scheduling personnel resources to complete the required actions to become properly licensed.

The SUXOS will be responsible for initiating requisitions for demolition materials. Procurement of explosive materials will be limited to the amount needed to complete the disposal operations. The requisition of explosives will be in accordance with PIKA's purchasing policy to ensure the best possible price for acquiring the explosive materials. This requisition will be accomplished by submitting a

purchase order (PO) request through the PM, who reviews and approves the request before forwarding it to PIKA's purchasing and accounting departments.

PIKA will purchase the required explosives through commercial suppliers in Ohio. The distributor will be provided a certified statement of the intended use of the explosive material. This distributor will be licensed by the BATFE and the state to sell and transport initiators/high explosives and will be capable of resupply within 24 hours.

4.3 Description and Estimated Quantity of Explosives

PIKA will utilize electric detonators, one pound boosters, and perforators for demolition shots to control the operation and reduce the NEW to be used. PIKA uses DOT Class 1.4 explosives whenever possible, which are safer to handle, easier and less expensive to ship and store, and more readily available.

4.4 Explosive Storage Magazine

4.4.1 Magazine Type

See the ESP for this information (the ESP is submitted under separate cover).

4.4.2 Quantity Distance Criteria

See the ESP for this information.

4.4.3 Lightning Protection

See the ESP for this information.

4.4.4 Magazine Security

See the ESP for this information.

4.4.5 Controls for Public Exposure

See the ESP for this information.

4.4.6 Site Map

See the ESP for this information.

4.5 Transportation

4.5.1 Procedures for Transporting Explosives

Transportation of explosives will be conducted in accordance with the PIKA Explosives Transport SOP. The roads to be traveled are located within the RVAAP boundaries and will include paved roads. PIKA personnel transporting explosives will use two BATFE approved day boxes for the transport of demolition material. The first box will contain the electric detonators, and the second will contain the

perforators, 1 pound boosters, and detonating cord. A predetermined route will be identified and used when transporting explosives.

4.5.2 Requirements for Explosives Transport Vehicle

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

1. Vehicle engine will not be running, and wheel chocks will be set when loading/ unloading explosives.
2. Explosives will be transported in a covered pick-up truck whenever possible. When using an open vehicle, explosives will be covered with a flame-resistant tarpaulin (except when loading/unloading).
3. The area of the vehicle where the explosives are placed for transportation will have a bed liner, dunnage, or sandbags placed in the area to protect the explosive from contact with the metal bed and fittings.
4. Explosive-laden vehicles will have a first aid kit, two 10 lb ABC fire extinguishers, and communications capabilities.
5. Compatibility requirements will be observed.
6. Drivers will comply with posted speed limits, but will not exceed a safe and reasonable speed for conditions.

4.6 Initial Receipt and Issuing Procedures

Initial receipt of demolition material will be conducted in accordance with the PIKA Explosives Acquisition, Storage, and Accountability SOP (located in Attachment I).

4.7 Responsibilities

4.7.1 Senior UXO Supervisor

The SUXOS maintains overall responsibility to process and requisition the required demolition materials. The SUXOS is also ultimately responsible for maintaining accountability of demolition materials and immediately reporting any losses or discrepancies to BATFE, and PIKA.

4.7.2 Individual Responsibilities

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

4.7.3 Authorized Personnel

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

4.8 Inventory

The PIKA Explosives Acquisition, Storage, and Accountability SOP (located in Attachment I) list the procedures to be followed for the inventory, notification of loss/theft, and disposition of demolition material at the conclusion of the day.

4.9 Reconciliation of Discrepancies

In the event there is a discrepancy during the inventory, the item(s) will be recounted a minimum of two additional times. If a discrepancy exists, the PIKA PM, and the BATFE will be notified.

4.10 Lost, Stolen, or Unauthorized Use

If it is discovered that explosive items have been lost, stolen, or used without proper authorization, the PIKA PM, and the BATFE will be notified.

4.11 Return of Explosives to Storage

Explosives that have been issued but not used during the course of the workday will be returned to the magazine prior to that shift ending. The explosives being returned will be recorded on the Magazine Data Cards and the Explosive Usage Report.

4.12 Forms

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

5.0 QUALITY CONTROL PLAN

5.1 Corporate Commitment to Quality

This Quality Control Plan (QCP), as a component of the PIKA Quality Assurance Program (QAP), provides the procedures for controlling and measuring the quality of all work performed during site activities at RVAAP.

This QCP has been developed to ensure compliance with appropriate industry and regulatory standards. It will be used to ensure activities related to this project are conducted in a planned and controlled manner, tasks conform to contractual requirements, and appropriate documentation is generated to support each activity for which PIKA is responsible. All QC activities will be performed and documented in accordance with applicable professional and technical standards and contract requirements.

It is PIKA policy to perform all work in conformance with applicable standards of quality. The procedures specified in the QCP will be considered minimum acceptable standards for PIKA. Additional requirements that exceed the strict procedures reflected in this QCP may be specified by the client or regulatory agencies and will be complied with. Procedures less stringent than those specified will not be adopted without prior written approval from the client and the PIKA Quality Program Management Team.

This QCP must be reviewed and formally approved before field operations commence. It is the personal responsibility of all personnel associated with this project to understand and maintain the quality issues applicable to their work assignments.

5.2 Quality Assurance/Quality Control

5.2.1 Quality Assurance

Quality Assurance (QA) will be accomplished by the PIKA QA Manager (QAM), who will evaluate the field activities. The purpose of the evaluation will be to ensure the field activities meet the specifications of the SOW and approved O&M Plan.

PIKA has a Corporate Management Plan that is documented and implemented through our QAP, and uses the three phases of inspection-Preparatory, Initial, and Follow-up phases of inspection, which are detailed in the site-specific quality control plan below.

5.2.2 Site-Specific Quality Control Plan

This QCP details the quality management procedures to be followed during the site activities at RVAAP. Site-specific information includes, but is not limited to, project personnel, definable features of work, required control operations, equipment tests, specific equipment calibration/response check procedures, audit procedures and client or regulatory agency requirements. This QCP provides procedures for:

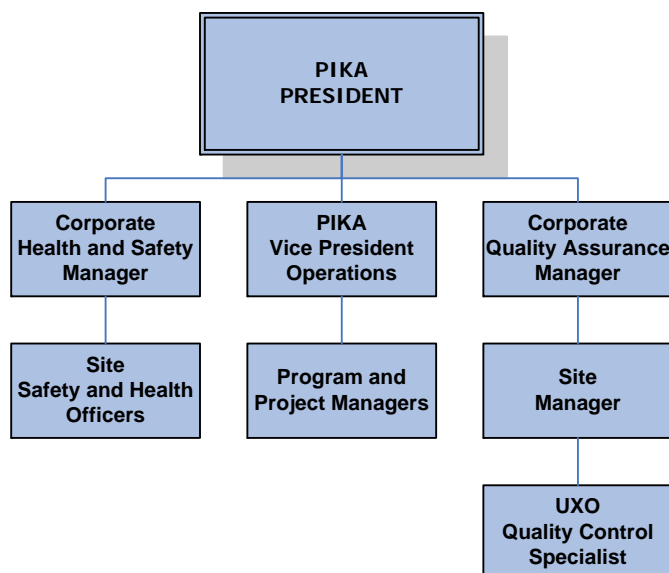
- Determining compliance with this plan and all other elements of the O&M Plan;
- Determining the effectiveness of work performed;
- Inspecting the maintenance and accuracy of site records; and
- Testing, calibrating or response checking equipment used to perform tasks.

5.2.3 Quality Program Management Structure

The following section describes the structure of the quality management team for PIKA's operations at RVAAP. Personnel were selected based on previous experience and their familiarity with the PIKA QA/QC system. The project team will provide the specific technical and management capabilities and qualifications to perform the contract work.

The PIKA Quality Assurance organization hierarchy of positions responsible for establishing PIKA's QAP is shown in **Figure 5-1**. It includes the President, the Corporate QAM, the Operations Manager, the PgMs, PMs, the Site Manager (SM), the CHSM, and other project personnel.

Figure 5-1: PIKA Quality Assurance Organization



5.2.4 President

The PIKA President is ultimately responsible for the effective implementation of the QCP for all field operations. He issues the Corporate Policy Statement and directs management and workers to follow the requirements of the QCP.

The President has chosen to delegate quality assurance authority as defined in the following paragraphs. Each designee is held accountable for delegated authorities.

5.2.5 Vice President of Operations

The Vice President of Operations has overall authority and responsibility for quality achievement of projects and project support programs. He will foster a culture of excellence for quality and safety and assign responsible personnel to the Program and Project Manager Positions.

5.2.6 Corporate QA Manager

The QAM reports to the President and has the authority and overall responsibility for independently verifying that quality is achieved. The QAM will:

- Foster a culture of excellence for quality;
- Manage the QA organization and maintain the QAP;
- Approve QA requirement documents, project and program implementing procedures, and subcontractor QAP;
- Assess the effective implementation of the QAP;
- Ensure that all personnel are properly trained and adequately experienced for the duties;
- Establish guidelines to assist in the development of program, project, site and task specific QC policies and procedures;
- Ensure corrective actions are documented and acknowledged by the PM and field personnel, as well as communicate to the client, when adverse situations or defective work result from a project activity;
- Conduct periodic field audits of the programs, projects and sites and submitting a report of findings to the President;
- Ensure project deliverables are defined prior to initiation of field operations and are submitted as required by the work plan and project schedule; and
- Report regularly to the President on the adequacy, status, and effectiveness of the QC program.

5.2.7 Project Manager

The PM is responsible for ensuring the availability of the resources needed to implement the project QCP and will ensure the QC processes are incorporated in the project plans, procedures and training for the specific project. The PM is responsible for the quality and timeliness of all project activities, including those performed by subcontractors and suppliers. The PM's primary responsibilities are:

- Review and approval of sampling, testing, and field investigation methods and QCP, including designs, schedules and labor allocations;
- Preparation of progress reports with the assistance of key support personnel;
- Overall project quality management;
- Coordinating with the SM and Site Safety and Health Officer (SSHO) to ensure project quality and safety issues are addressed;
- Developing project plans and associated documentation;
- Technical review of all project deliverables;
- Maintaining contact with the client; and
- Scheduling activities and preparing documents and reports associated with the project.

5.2.8 Site Manager/Supervisor

The SM supports the PM in day-to-day operations and also reports directly to the QAM on matters relating to quality. The SM will also act as the SSHO and UXOQCS for this project. The SM has sufficient authority, including stop work authority, to ensure that project activities comply with applicable specifications of the contract and QCP. This authority applies equally to all project activities, whether performed onsite or offsite, PIKA or subcontractors and suppliers. The SM responsibilities include:

- Ensuring compliance with contract documents specifications relating to QC;
- Assessment of the effective implementation of the project QCP;
- The authority to stop work when significant conditions adversely impact the quality of work and such action is warranted; and
- Identify quality problems and ensure that unsatisfactory conditions are controlled until proper disposition has occurred.

5.2.9 Site Safety and Health Officer

The SSHO will be responsible for:

- Implementing the Corporate Health and Safety Program;
- Reviewing and monitoring compliance with project-specific health and safety plans;
- Implementing corrective measures for health and safety deficiencies; and

- Conducting required training and medical monitoring of personnel.

The SSHO has the authority to require corrective measures related to health and safety issues and to stop work, if required, to ensure a safe working environment.

5.2.10 UXO Quality Control Specialist (UXOQCS)

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

- Coordinating with RVAAP and e²M to ensure that QC objectives appropriate to the project are set and all personnel are aware of these objectives;
- Maintain a QC log to document details for field activities during QC monitoring activities to serve as a memory aid in preparation of the daily QC Report;
- Coordinating with the PIKA field team to ensure that QC procedures are being followed and are appropriate for achieving data validity sufficient to meet QC objectives;
- Conducting periodic QC surveillances of all site activities using the 3 phase inspection process and recording the findings in the Daily Quality Control Report for the Preparatory, Initial and Follow-on QC Report;
- Reporting noncompliance with QC criteria to PIKA's PM and documenting these non-conformances on the PIKA Nonconformance Report;
- Initiating a Rework Items List on nonconformance areas that must be accomplished to meet quality specifications;
- Conducting QC Meetings as required by e²M (Record meeting outcome in the Daily QC Report);
- Coordinating with the responsible parties to initiate the proper corrective actions to be taken in the event of a QC deviation and documenting these actions on the Corrective Action Request; and
- Ensuring that Lessons Learned are documented and forwarded to the PIKA QC Manager for analysis.

5.2.11 Critical Issues/Activities

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

5.2.12 Employee Qualifications

Prior to an employee's initial assignment or any change in duties/assignment, the SM will physically review the employee's licenses, training records and certificates to ensure that the employee is qualified to perform the duties to which they are being assigned.

PIKA will ensure the UXO-qualified personnel meet the standards required by the client and will be prepared to submit a letter with resumes and UXO number from the UXO database to the client for approval prior to mobilizing to the site, if the client requests the files prior to or during the field operations.

The SSHO will maintain personnel files on each employee, to include copies of licenses, training records and certificates of qualifications that support the employee's placement and position. At a minimum the files will include:

- NAVSCOLEOD certification (UXO personnel only);
- Current certificate of medical clearance/annual physical examination;
- 40-hour HAZWOPER safety training certification;
- 8-hour HAZWOPER supervisor certification (required by position);
- Current 8-hour annual HAZWOPER refresher certificate; and
- Current certificate for cardiopulmonary resuscitation (CPR) training and First Aid.

5.2.13 Publications

PIKA has conducted a technical review of the SOW and all pertinent data, and compiled a list of required publications to be maintained at the site. In addition to this list, PIKA will make available, in a timely manner, any additional manuals the SM may require. Prior to the start of operations and periodically throughout the project, the SM will check to ensure that site publications are present and in good repair. Results of this inspection will be recorded and reported. The currently identified publications include:

- PIKA Corporate Safety and Health Program;
- OSHA, 29 CFR 1910 and 1926, Occupational Safety and Health Standards;
- 40 CFR parts 172,173,177;
- Engineering Manual (EM) 385-I-I, Safety and Health Requirements Manual;
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards;
- DA Pamphlet 385-64, Ammunition and Explosives Safety Standards;
- Army Regulation 385-64, Ammunition and Explosives Safety Standards;

- Material Safety Data Sheets for hazardous substances used on-site.
- EP 75-1-2 MEC Support during HTRW and Construction Activities

5.2.14 Monitoring Equipment Calibration and Testing

Measurement equipment utilized on-site (e.g., sampling pumps, real-time monitors, etc.) will be checked for operational reliability and calibration in accordance with the manufacturer's specifications.

5.2.15 Maintenance Program

All tools, instruments, and equipment used on-site will be properly maintained and calibrated (as necessary) in accordance with the manufacturer's specifications or standard industry practices. This applies to communications equipment, vehicles/machinery, environmental monitoring equipment, and personal protective equipment.

Equipment will be protected from dust and contamination and visually checked for damage prior to use. Preventative maintenance will be performed on a regular basis. Critical spare parts will be kept on site to minimize downtime.

PIKA has an aggressive maintenance program implemented as discussed below.

- **Preventive Maintenance:** The assigned operator of each piece of equipment will perform scheduled, and when necessary, unscheduled, preventative maintenance to ensure the equipment is maintained in a satisfactory operating condition. Preventive maintenance consists of before, during and after operational checks and documentation of these activities, either in the operators log book or in the team leader's field log book.
- **Routine Repair and Adjustment:** Routine repair and adjustment is based on the manufacturer's schedule for adjustment, calibration or replacement. All equipment used on site will be maintained and submitted for routine repair and adjustment in accordance with the manufacturer's specifications.
- **Emergency Repair:** Emergency repair includes any unscheduled repair. This type of repair will be conducted using manufacturer required replacement parts and procedures to ensure the continued integrity of the equipment.
- **Radios/Cellular Phones:** Before-operation checks will include verification of a complete battery charge and a communications check to ensure the unit is operating properly. During-operation checks will include periodic checks to ensure battery charge remains adequate and a communications check once an hour for the radios and once a day for the cellular phone.

After-operation maintenance will include a communications check, cleaning, turning off and placing in battery charger.

- **Vehicles:** Before-operation checks will include an operator general inspection of the entire unit to include fluid levels, safety equipment operation and tire condition. During-operation checks will include frequent inspections of the dials and gauges and a tire inspection at breaks. After-operation checks will include topping off of any fluids, which are low, a general cleaning and a recheck of all safety related equipment.

5.2.16 Logs and Records

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

- **Daily Journal:** The SM will maintain the daily journal. This journal will provide a summary of all operations conducted to include information on weather conditions, problem areas, work plan modifications, injuries, start/stop times, tailgate safety briefs, equipment discrepancies, training conducted, visitors, and any additional items deemed appropriate.
- **Safety Log Book:** The SM will maintain this safety log book. The log will be used to record all safety related matters associated with the specific project such as: safety briefings/meetings, including items covered and attendees; safety audits; near-misses/accidents/incidents. It will include cause and corrective action taken; weather conditions; and any other matters encompassing safety.
- **Training Records:** The SM will maintain training records for all site personnel. These records will contain training certificates, licenses and other qualifying data for an individual's duty position.
- **Quality Control Log Book:** The SM will maintain this log and will record the performance and results of QC checks and audits.
- **Visitors Sign-in Sheet:** The SM will maintain this log for all personnel that are not directly involved in the project site activities. This log will identify visitors by name, company, date, time in/out and a contact phone number.
- **Photographic Record:** The SM will maintain a photographic record to record all video recording and photographs taken to document work and/or site conditions. Photographs and video tapes will be marked with a unique identifying number relating back to the photographic

log, and will be maintained on file until the end of the project. Photographic negatives and duplicate copies of video tapes will be forwarded to the PIKA corporate office for safekeeping.

- **Site Maps:** The SM will maintain working maps of the operating areas. These maps will be used to document task progression and other pertinent activities and locations.

Log books and records will be inspected by the SSHO/UXOQCS on a weekly basis. These inspections will focus on the completeness, accuracy, and legibility of the entries and records. Results of these inspections will be forwarded to the SM. The log keeper's immediate supervisor will review and initial in the log book concurrence with the log book entries on a daily basis.

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

5.2.17 QA/QC Audits and Surveillance

An audit is an examination and evaluation performed to determine whether applicable elements of the site-specific QCP and O&M Plan have been performed, documented, and effectively implemented in accordance with specified requirements.

As part of the QAP, PIKA will conduct both internal and external audits and surveillance at RVAAP. This is to ensure that all procedures and protocols are being followed and that the resulting data is accurate and defensible. Field audits will concentrate on handling procedures, proper documentation, and checks of resulting data for completeness and accuracy within established QC limits.

5.2.18 QC Inspections

PIKA will perform inspection and surveillance of all work areas to maintain control over field activities identified in the O&M Plan.

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

Discrepancies between existing conditions and approved plans/procedures will be resolved and corrective actions taken for unsatisfactory and nonconforming conditions identified during an inspection. This will be verified by the SM or his designee prior to granting approval for work to begin.

The SM will discuss job hazards with site personnel and verify that the necessary safety measures are in place and ready for use. He will also be responsible for verifying that a daily health and safety inspection is performed and documented as prescribed in the SSHASP.

Additional inspections performed on the same task may be required at the discretion of RVAAP, e²M, or the SM. Additional inspections are generally warranted under any of the following conditions:

- Unsatisfactory work, as determined by PIKA or the client;
- Changes in key personnel;
- Resumption of work after a substantial period of inactivity (e.g., 2 weeks or more); and
- Changes to the project scope of work/specifications.

5.2.19 Phase Inspection Process

The UXOQCS will ensure that the 3-phase control process is implemented for each definable feature of work, regardless of whether they are performed by PIKA or its subcontractors. Each control phase is important for obtaining a quality product. However, the preparatory and initial inspections will be particularly invaluable in preventing problems. Production work will not be performed on a definable feature of work until a successful preparatory and initial phase inspection has been completed.

5.2.20 Preparatory Phase Inspection

A preparatory phase inspection will be performed prior to beginning each task. The purpose of this inspection will be to review applicable specifications and verify the necessary resources, conditions, and controls are in place and compliant before the start of work activities.

The UXOQCS will verify with the client that all prerequisite submittals have been submitted and approved, and that lessons learned during previous similar work have been incorporated as appropriate into the project procedures to prevent recurrence of past problems. The UXOQCS will meet with the PM and the staff responsible for the performance of a given task, including subcontractor personnel. He/she will generate and use a Preparatory Phase Inspection Checklist.

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

- Required plans and procedures have been prepared and approved and are available to the field staff;

- Field equipment is appropriate for its intended use, available, functional, and properly calibrated;
- Responsibilities have been assigned and communicated; the field staff have the necessary knowledge, expertise, and information to perform their jobs;
- The arrangements for support services have been made; and
- The prerequisite site work has been completed.

Discrepancies between existing conditions and approved plans/procedures will be resolved and corrective actions taken for unsatisfactory and nonconforming conditions identified during a preparatory phase inspection. This will be verified by the SUXOS or his designee prior to granting approval for work to begin.

The SSHO will discuss job hazards with site personnel and verify that the necessary safety measures are in place and ready for use.

5.2.21 Initial Phase Inspection

An initial phase inspection will be performed the first time a task is performed. The purpose of the inspection will be to:

- Check the preliminary work for compliance with procedures and contract specifications;
- Verify inspection and testing and establish the acceptable level of workmanship;
- Check safety compliance, review the minutes of the Preparatory Phase Inspection; and
- Check for omissions and resolve differences of interpretation.
-

The UXOQCS will be responsible for ensuring that all discrepancies between site practices and approved specifications are identified and resolved.

Discrepancies between site practices and the approved plans/procedures will be resolved. Corrective actions for unsatisfactory conditions or practices will be verified by the SUXOS or his designee, prior to granting approval to proceed.

The results of the initial phase inspection results will be documented in the QC log book, on the Initial Inspection Checklist and summarized in the Daily QC Report.

5.2.22 Follow-up Phase Inspection

A follow up phase inspection is performed each day a task is performed. The purpose of the inspection is to ensure a level of continuous compliance and workmanship. The UXOQCS is responsible for

onsite monitoring of the practices and operations taking place and verifying continued compliance with the specifications and requirements of the contract and approved project plans and procedures. If a work stoppage is required to correct some procedure a Stop Work Order will be completed.

The UXOQCS is also responsible for verifying that a daily health and safety inspection is performed and documented as prescribed in the SSHASP. The SUXOS will oversee and observe the same activities as under the initial inspection. Discrepancies between site practices and the approved plans/procedures will be resolved and corrective actions for unsatisfactory and nonconforming conditions or practices verified by the SUXOS or his designee, prior to granting approval to continue work. Follow-up phase inspection results will be documented in the QC log book on the Follow-up Inspection Checklist and summarized in the Daily QC Report.

Additional inspections performed on the same task may be required at the discretion of RVAAP or the SUXOS with the approval of the Client. Additional preparatory and initial inspections are generally warranted under any of the following conditions:

- Unsatisfactory work, as determined by PIKA or the client;
- Changes in key personnel;
- Resumption of work after a substantial period of inactivity (e.g., 2 weeks or more); and
- Changes to the project scope of work/specifications.

5.2.23 Lessons Learned

During the course of field activities, data or information may be discovered that could eliminate or reduce challenges and/or offer opportunities for quality and productivity improvements through value engineering. These lessons learned will be valuable tools in updating plans and procedures for potential follow-on field operations.

Lessons learned will be captured, documented, and submitted to the client during the entire project. The SM will gather this information, and include it with the weekly status report.

Topics for consideration for determining lessons learned include:

- Problems encountered;
- Solutions developed to solve the problems;
- Alternative procedures or processes that improve the field operations; and
- Quality/Productivity Improvements.

5.2.24 Project Correspondence

All written and verbal (i.e., person-to-person or via telephone) correspondence will be documented and routed to the PIKA PM. Incoming written communications will be annotated with the date received.

Telephone communications to office personnel must be recorded on a Telephone Conversation/Correspondence Record form. Of critical importance is the documentation of activities that stop work or require a communication to or from RVAAP or e²M.

5.2.25 PIKA Point of Contact

The PIKA PM is Mr. Brian Stockwell. Mr. Stockwell can be contacted at the address and the numbers below:

PIKA International, Inc.
8451 State Route 5
Building 1038
Ravenna, OH 44266

Office: (330) 358-7135

Mobile: (330) 352-6955

Facsimile: (330) 358-2924

Electronic Mail: bstockwell@pikainc.com

5.2.26 Project Records

Project records will be maintained in project files for the contract duration.

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ATTACHMENT 1

Standard Operating Procedures (SOPs)

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the procedures applicable to the transport of explosives to include demolition material and munitions and explosives of concern (MEC). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to all PIKA site personnel involved in the transport of explosives. This ESHP is generic in nature and is not intended to cover all requirements necessary to ensure compliance at each site. It may be necessary to obtain state or local permits/licenses and even a Commercial Drivers License (CDL) in some instances. In most cases, the data contained in this ESHP and PIKA Forms ESHF-201 and ESHF-202 will be sufficient.

3.0 REGULATORY REFERENCES

Procedures and information contained in this document were obtained from the below listed references:

- Department of Transportation, 49 CFR Parts 172, 173, and 383, and all applicable sections.
- OSHA 29 CFR 1910 General Industry Standards.
- OSHA 29 CFR 1926 Construction Standards.
- Department of Defense (DoD) 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*. 5 October 2004, with approved changes 14 December 2004.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, *Safety and Health Requirements Manual*, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.
- USACE, EM 385-1-4009, *Military Munitions Response Actions*, 15 June 2007.
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM), in conjunction with the Senior UXO Supervisor (SUXOS) will determine the specific-site requirements for explosive licensing, permitting, and placarding. The PM will then ensure that the appropriate requirements are communicated to the Corporate Safety and Health Manager (CSHM) and that they are incorporated into the site plans or added as an attachment to this ESHP should they differ. The PM will also be responsible for ensuring that the project-related manpower and personnel resources are available to ensure the safe and effective implementation of this ESHP. Any site-specific attachments added to this ESHP will be reviewed and approved by the CSHM and the SUXOS.

4.2 SENIOR UXO SUPERVISOR

The SUXOS will be responsible for ensuring that the requirements of this ESHP, and any site-specific attachments, are enforced and that the pertinent PIKA forms, ESHF-201 and ESHF-202, are properly completed and in the vehicle(s) used for explosive transportation.

4.3 EXPLOSIVE VEHICLE DRIVER

Individuals assigned to transport explosives will meet the site driver requirements, be thoroughly familiar with this ESHP, and know and understand all emergency procedures in the event of an accident/incident.

5.0 EXPLOSIVES AND MEC TRANSPORTATION REQUIREMENTS

5.1 GENERAL REQUIREMENTS

All contractors transporting MEC or explosives will comply with all Federal, state, and local regulations. Permits for the transportation of explosives or MEC are not required for on-site or inter-facility transportation within Federal installations. Off-site shipment of MEC and explosives will be accomplished by approved commercial carriers. For off-site shipment:

- MEC will be packaged IAW 49 Code of Federal Register (CFR) part 172 and 173;
- Drivers will have PIKA Form ESHF-201 (Special Instructions for Vehicle Drivers);
- Vehicles will be inspected using the PIKA Motor Vehicle Inspection Form, and if applicable, be properly placarded;
- Compatibility requirements will be observed;
- The load shall be well braced and, except when in closed vans, covered with a fire-resistant tarpaulin.

5.2 TRANSPORTATION ON-SITE AND ON FEDERAL INSTALLATIONS

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

- Vehicles will be inspected prior to use each day using the PIKA Weekly Vehicle Inspection Checklists and will be properly placarded;
- Vehicle engine will not be running, wheels chocked and brakes will be set when loading/unloading explosives;
- 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);
- The area of the vehicle where the explosives are placed for transportation will have either a plastic bed liner, dunnage, or sand bags placed in the area to protect the explosives from contact with the metal bed and fittings;
- Explosive vehicles will have a first aid kit, **a minimum of** two fire extinguishers with a rating of at least 10-BC units, and communications capabilities;
- Initiating explosives, such as detonators, will remain separated at all times;
- Compatibility requirements will be observed;
- Operators transporting explosives will have a valid drivers license;
- Operators will drive at a safe speed based on road conditions, but never over the speed limit. Vehicles transporting explosives off-road will not exceed 25 mph
- PIKA will also comply with any installation-specific explosives transportation procedures, to include those procedures related to drivers, equipment requirements and vehicle inspections.

5.3 GENERAL PLACARDING REQUIREMENTS

According to 49 CFR 172.504, the placarding requirements listed below will apply to PIKA explosives transportation:

- (a) "Except as otherwise provided, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 1 and 2, in accordance with other requirements and exceptions." (Tables 1 and 2 are presented on the following page in Table 203-1 and 203-2.)
- (c) Exceptions for less than 454 kg (1,001 pounds). "Except for bulk packaging and hazardous materials subject to 172.505, when hazardous materials covered by Table 2 of this section are transported by highway or rail, placards are not required on:
 - (1) A transport vehicle or freight container which contains less than 454 kg (1,001 lbs.) aggregate gross weight of hazardous materials covered by Table 2 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, on transport vehicles for freight containers that are not otherwise required to be placarded.

5.4 OFF-SITE TRANSPORTATION OF EXPLOSIVES OVER PUBLIC HIGHWAY

5.4.1 DOT Certificate of Registration

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

TABLE 203 – 1: PLACARDING REQUIREMENTS

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard Design Reference
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 203 – 2

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)	

5.4.2 Definition of Commercial Motor Vehicles

The term "commercial motor vehicle" (CMV) means a motor vehicle, or combination thereof, used in commerce to transport passengers or property if the motor vehicle meets any of the following:

- It has a gross combination weight rating of 11,794 or more kilograms (kg) (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
- It has a gross vehicle weight rating of 11,794 or more KG (26,001 pounds or more); or
- It is designed to transport 16 or more passengers, including the driver; or
- It 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).

5.4.3 CDL Requirements

If the vehicle being used does not weigh more than 26,000 pounds and the materials being transported do not require placards under the DOT Hazardous Materials Regulations (i.e., 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 situation is typical on PIKA project sites where only demolition materials classified as 1.4 are transported. However, if a CDL is required, the SUXOS will ensure that the requisite license/permits are obtained.

5.4.4 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 PIKA, check the Material Data Sheets presented in Attachment 1 to this ESH-203.

6.0 DOCUMENTATION

6.1 PIKA FORMS

Any time explosives are being transported this entire ESH-203 to include the completed copies of supporting forms ESHF-201 and ESHF-202, will be in the vehicle. A brief description of the relevant forms is included below and shall be used to ensure proper completion of the forms.

1. PIKA FORM ESHF-201

Only those items that 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.

2. PIKA FORM ESHF-202

The form will be completed ensuring the pertinent data for all those transporting explosives is included on the form. As with the other required form, this one will also 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 SUXOS.

6.2 BATF PERMIT/LICENSE

A copy of the current BATF license will accompany the vehicle at all times and will be readily available for inspection. A copy of the BATF license will also remain at the project site whenever explosives transportation is being conducted as a requirement of the clients Statement of Work.

7.0 ATTACHMENTS

The following attachment is included with this ESHP:

- Attachment 1 – Material Data Sheets

ATTACHMENT 1

MATERIAL DATA SHEETS

CORD, DETONATING - 1.4D - UN0289

NET EXPLOSIVE WEIGHT (NET):

0.00229 OZ = 1 Grain

80 gr. X .00229 = .1832 oz.

0.1832 oz. Per ft. x 100' = 18.32 oz. Total Net Explosive Weight per 100 feet

HAZARDOUS CLASS OF US MILITARY EXPLOSIVES AND MUNITIONS

Proper Shipping Name:

CORD DETONATING, FLEXIBLE UN0289 1.4D

49 CFR 172.101 - TABLE OF HAZMAT MATERIAL

CORD DETONATING, FLEXIBLE UN0289 1.4D

49 CFR 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

Packing Instruction	Inner Packaging	Intermediate Packaging	Outer Packaging
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 Packaging 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). Fiberboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Plywood (1D). Fiber (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

49 CFR 172.101 TABLE OF HAZMAT MATERIAL

CHARGERS, SHAPED, COMMERCIAL WITHOUT DETONATOR UN0441 1.4S

49 CFR 173.62

Packaging & Instructions #137

49 CFR ch. 1 (10-97 Edition) . 173.62

Packing Instruction	Inner Packaging	Intermediate Packaging	Outer Packaging
<p>137.....</p> <p>PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:</p> <p>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.</p> <p>2. For UN 0065 and UN 0289, inner Packaging are not required when they are fastened securely in coils.</p>	<p>Bags.....</p> <p>Plastics</p> <p>Boxes</p> <p>Fiberboard</p> <p>Tubes</p> <p>Fiberboard</p> <p>Metal</p> <p>Plastics</p> <p>Dividing partitions in the outer Packaging.</p>	<p>Not necessary</p>	<p>Boxes.</p> <p>Steel (4A).</p> <p>Aluminum (4B).</p> <p>Wood, natural, ordinary (4C1).</p> <p>Wood, natural, sift proof walls (4C2).</p> <p>Plywood (4D).</p> <p>Reconstituted wood (4F).</p> <p>Fiberboard (4G).</p>

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.

49 CFR 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 UN0244 1.4B

49 CFR 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.

49 CFR 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.

49 CFR 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 Packaging	Intermediate Packaging	Outer Packaging
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). Fiberboard (4G). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fiber (1G). Plastics, removable head (1H2).

49 CFR 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

49 CFR 172.101 TABLE OF HAZARDOUS MATERIALS

LIGHTER, FUSE 1.4S UN0131

49 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). Fiberboard (4G). Plastics, solid (4H2). Drums. Steel, removable head (1A2). Aluminum, removable head (1B2). Fiber (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

49 CFR 49 172.101 TABLE OF HAZARDOUS MATERIALS

FUSE, SAFETY UN0105 1.4S

49 CFR 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
<p>140.....</p> <p>PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:</p> <p>1. If the ends of UN 0104 are sealed, no inner packagings are required.</p> <p>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.</p> <p>3. For UN 0101, steel or aluminum boxes or drums must not be used.</p>	<p>Bags.....</p> <p>Plastics</p> <p>Reels.....</p> <p>Sheets.....</p> <p>Paper, Kraft</p> <p>Plastics</p>	<p>Not necessary</p>	<p>Boxes.</p> <p>Steel (4A).</p> <p>Aluminum (4B).</p> <p>Wood, natural, ordinary (4C1).</p> <p>Wood, natural, sift proof walls (4C2).</p> <p>Plywood (4D).</p> <p>Reconstituted wood (4F).</p> <p>Fiberboard (4G).</p> <p>Plastics, solid (4H2).</p> <p>Drums.</p> <p>Steel, removable head (1A2).</p> <p>Aluminum, removable head (1B2).</p> <p>Fiber (1G).</p>

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the on site Quality Control Specialist (QCS) the minimum instruction necessary to professionally and competently perform the job of ensuring a quality product that conforms with agreed upon results. This ESHP is also intended to provide the user the understanding of the theories used in the development of specific procedures within this ESHP.

2.0 SCOPE

This ESHP applies to any person affecting the quality of PIKA's products, but is specifically developed for use by the Quality Control Specialist in the performance of his/her duties.

3.0 REFERENCES

The following standards directly apply to the conduct of operations associated with the ESHP. In the event other hazards are associated with the conduct of this ESHP, consultation of other ESHPs and regulatory references may be needed. Additionally, this ESHP has also been designed to meet the U.S. Army Corps of Engineers (USACE) requirements outlined below.

- ISO 9001:2000
- MIL-STD-1916
- DID MR-005-11

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

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

4.2 OCCUPATIONAL SAFETY AND HEALTH MANAGER

The Corporate Safety and Health Manager (CSHM) is responsible for the continued development, improvement, and implementation of the PIKA Corporate Environmental Safety & Health Program, to include this ESHP. To accomplish this end, the CSHM will be responsible for:

1. Conducting an annual review of this ESHP and making modifications as necessary;

2. Developing or reviewing site plans that specify the personal protective equipment (PPE) and other hazard controls that apply to the implementation of this ESHP to ensure proper protection of personnel.
3. Providing the Site Safety and Health Officer (SSHO) with consultation related to visitor entry and protective measures.
4. Periodically auditing PIKA work sites to ensure compliance with this ESHP.

4.3 SENIOR UXO SUPERVISOR

The Senior UXO Supervisor (SUXOS) will ensure that the UXO Quality Control Specialist (UXOQCS) is supplied with any and all administrative needs in order to implement this ESHP. The SUXOS has overall responsibility to ensure QC department for inspection and acceptance. The SUXOS is responsible to effect any and all corrective actions necessary in the event a site non-conformance or non-compliance is identified. The SUXOS is responsible to lead in the development of lessons learned and ensure any lessons learned are implemented where needed.

4.4 UXO SUPERVISOR

The UXO Supervisor (UXOT3) shall be responsible for understanding all aspects of this ESHP that relates to his/her daily activities and the level of workmanship required under each individual task. The UXOT3 has the responsibility to perform any and all actions necessary to ensure all work and products performed or created by his/her team/function meet all previously agreed upon results that may be specified in the SOW, WP or other regulatory documents and that these responsibilities have been met prior to presenting any work or product to the SUXOS as completed.

4.5 PROJECT OR SITE GEOPHYSICIST

The geophysicist has the responsibility for developing the site-specific geophysical plans and procedures and for working with the Quality Control Manager (QCM) in the development for geophysical QC procedures. The geophysicist may be responsible for processing digital geophysical data collected by the QCS for QC purposes. The geophysicist is responsible for assisting the project team in any corrective actions and/or lessons learned that may need to be implemented or captured/analyzed.

4.6 UXO QUALITY CONTROL MANAGER

The PIKA QCM is responsible for the implementation and maintenance of this ESHP. The PIKA QCM is responsible for ensuring that the UXOQCS understands this ESHP and conducts all QC activities in accordance with this ESHP. The QCM may be responsible for processing digital geophysical data collected by the QCS for QC purposes.

The QCM is responsible for compiling data that relates to quality aspects of a specific project, analyzing that data in order to assist project management in the development of efficient production methods. The QCM is responsible for maintaining the training level of all quality personnel working on specific projects. This training will meet or exceed customer requirements. The QCM has the responsibility to interact, when necessary, with the customer in order to communicate data, progress or other information desired by the customer. The QCM is responsible for reporting directly to the President of PIKA on any and all aspects of the quality program as well as project specific quality aspects.

4.7 UXO QUALITY CONTROL SPECIALIST

The UXOQCS is responsible for the field implementation of this ESHP. In addition, it is the responsibility of the UXOQCS to make it understood throughout the entire project site the level of workmanship that must be demonstrated in order to meet the goals and expectations, previously agreed upon by PIKA and its customer as well as the various stakeholders as detailed in the approved work plan and/or SOW. The UXOQCS will also ensure that relevant sections of this ESHP are discussed in the tailgate safety briefings and that information related to its daily implementation is documented in the Site Operational Log. The QCS is responsible for ensuring all data and deliverables are accurate prior to submission to intended receivers.

5.0 PROCEDURES

Quality Control procedures are broken down in this ESHP into eight (8) sections. These sections are Surveillance Activities, Inspections, Data Quality, Non-Conformance/Non-Compliance, Corrective Actions, Root-Cause Analysis, Lessons Learned and Documentation. The UXOQCS and the PIKA Quality Control Manager (QCM) shall work together at the start of a specific project to develop any project-specific QC procedures and develop an activity / frequency index to ensure the more complex activities are surveilled more often than some of the more simple activities. The overall goal of the PIKA quality process is to move away from the costly procedure of controlling conformance through inspection. Instead, PIKA will inspect work until such time as QC personnel are convinced that the level of quality is satisfactory then reduce the quantity of inspections while controlling quality through process surveillances. The amount of inspections will increase if product is found to be non-conforming or work is found to be in non-compliance with requirements and corrective actions initiated. Once corrective actions have been verified, inspections may be reduced.

5.1 SURVEILLANCE ACTIVITIES (PROCESS VERIFICATION)

Surveillance activities conducted at the project site will ensure actual work processes match those instructions set forth in the approved work plan as well as all other work instructions and industry standards. It is the responsibility of the UXOT3 and SUXOS to

ensure the written procedures are followed by all personnel given such responsibility. It is then the responsibility of the UXOQCS to verify that these processes are being followed. The UXOQCS will review the written processes for the activity being surveilled prior to conducting the surveillance. The UXOQCS will then travel (if necessary) to the location of the process being performed and examine the methods being conducted utilizing the written process (WP or SOW) as a reference. These actions shall be consistent with the procedures detailed in the WP and SOW. Operational functions to be surveilled include, but are not limited to: Tailgate safety briefing, equipment maintenance, equipment calibration, safety operations, grid tracking and control, safe separation distances, information gathering and reporting, clearance operations, geophysical operations, explosive storage and accountability, demolition procedures and safety, scrap inspection and processing and scrap disposal. If the actual work practices differ from the procedures detailed in the SOW or WP, a non-compliance exists and shall be documented IAW section 5.8 of this ESHP. All surveillances shall be documented IAW section 5.8 of this ESHP.

5.2 INSPECTIONS

5.2.1 MIL-STD-1916 BASED INSPECTIONS (Process Validation)

MIL-STD-1916 was selected by PIKA as its quality acceptance model for two reasons. First, MIL-STD-1916 is approved for use by all Departments and Agencies of the Department of Defense for ensuring the quality of products and services. Secondly, it is a tool to be used in order to move away from the Acceptable Quality Level (AQL) methodology toward a Process Control system of ensuring quality. Once an acceptable level of quality has been established by operational functions and verified by the UXOQCS through the use of sampling inspection, a system of Process Control takes over and less sampling is required. This is accomplished with structured and documented process surveillances and a sampling inspection that is documented, repeatable and defensible.

To validate the work procedures being used to perform various tasks for a given project, the UXOQCS will conduct a sampling inspection of each area or item requiring customer acceptance. These inspections will vary from task order to task order depending on technology used, customer requirements, expected results as well as various other factors. The most common types of inspections are listed below. PIKA will control quality and the risk of nonconformance by employing efficient processes and process control so that inspections can be reduced, thus reducing costs. This allows a constant feedback to the operational teams as to the level of effort vs. their level of quality. In addition, it allows other stakeholders to monitor the level of quality from a repeatable standpoint. In order to determine the type of sampling plan to implement, four items must be considered (See MIL-STD-1916 Section 4.2.3).

- **Verification Level:** Either the customer or PIKA will assign a verification level to the project. This verification level (VL) varies depending on the size or quantity of items being inspected and the amount of effort to ensure conformance. For most grid clearance type projects where grids are 100 feet square to 400 feet square, a VL of II is sufficient. For munitions debris (MD)/Range Residue (RR) processing, the VL may need to be raised to accommodate a large amount of scrap being inspected.
- **Type of Sampling:** The type of sampling best suited to most UXO projects is attribute sampling.
- **Lot or Interval Size Code Letter:** This code letter (CL) is found by consulting MIL-STD-1916 Chapter 5 Table II and cross-referencing the lot size (For example: Grid lane quantity or pieces of OE scrap) with the VL.
- **Sampling/Switching Procedure:** After determining a sampling procedure (Reduced, Normal or Tightened) and consulting MIL-STD-1916 Chapter 5.2.1.3, the QCS and/or QCM will determine the sampling size in this manner: Assuming a starting procedure of Normal (Most projects can be started at Normal sampling), inspections occur at a rate dictated by consulting MIL-STD-1916 Chapter 5 Table II and cross referencing the CL determined earlier in Table I with the VL determined at the start of the project and determining the number directly under the VL (For example: A CL "A", a VL of II and a sampling of Normal would dictate a sampling size of 12.) The sample size can increase or decrease depending on the lot acceptance or rejection. Starting at Normal, if two lots in the past five inspected are rejected, the switching procedure dictates a switch to Tightened sampling. The size of the sample is found by consulting MIL-STD-1916 Chapter 5 Table II, and reading the number to the left of the Normal sample. In the case of the above example, the sample size would increase from 12 to 32. Tightened sampling will remain in effect until five consecutive lots have been accepted at which point Normal sampling will be resumed. Once 10 consecutive lots have been accepted, Reduced sampling can be instituted. The number is again found by consulting MIL-STD-1916 Chapter 5 Table II, and reading the number to the right of the Normal sample. In the case of the above example the sample will be reduced to five. Reduced sampling will remain in effect until one lot is rejected at which point Normal sampling will be instituted.

As most removal actions are conducted in areas that have been delineated into quadrilateral grids, this ESHP will assume this unless otherwise stated. These grids vary in size but are usually 100' x 100' or 200' x 200'. For QC purposes, grids are further delineated into lanes of varying widths. Generally, Mag and Dig grids are delineated into five-foot-wide lanes while grids cleared utilizing Digital Geophysics are delineated into two, two and a half or three feet lanes. Depending on the size of the grid, the number

of lanes will vary. All inspection activities will be documented IAW section 5.8 of this ESHP.

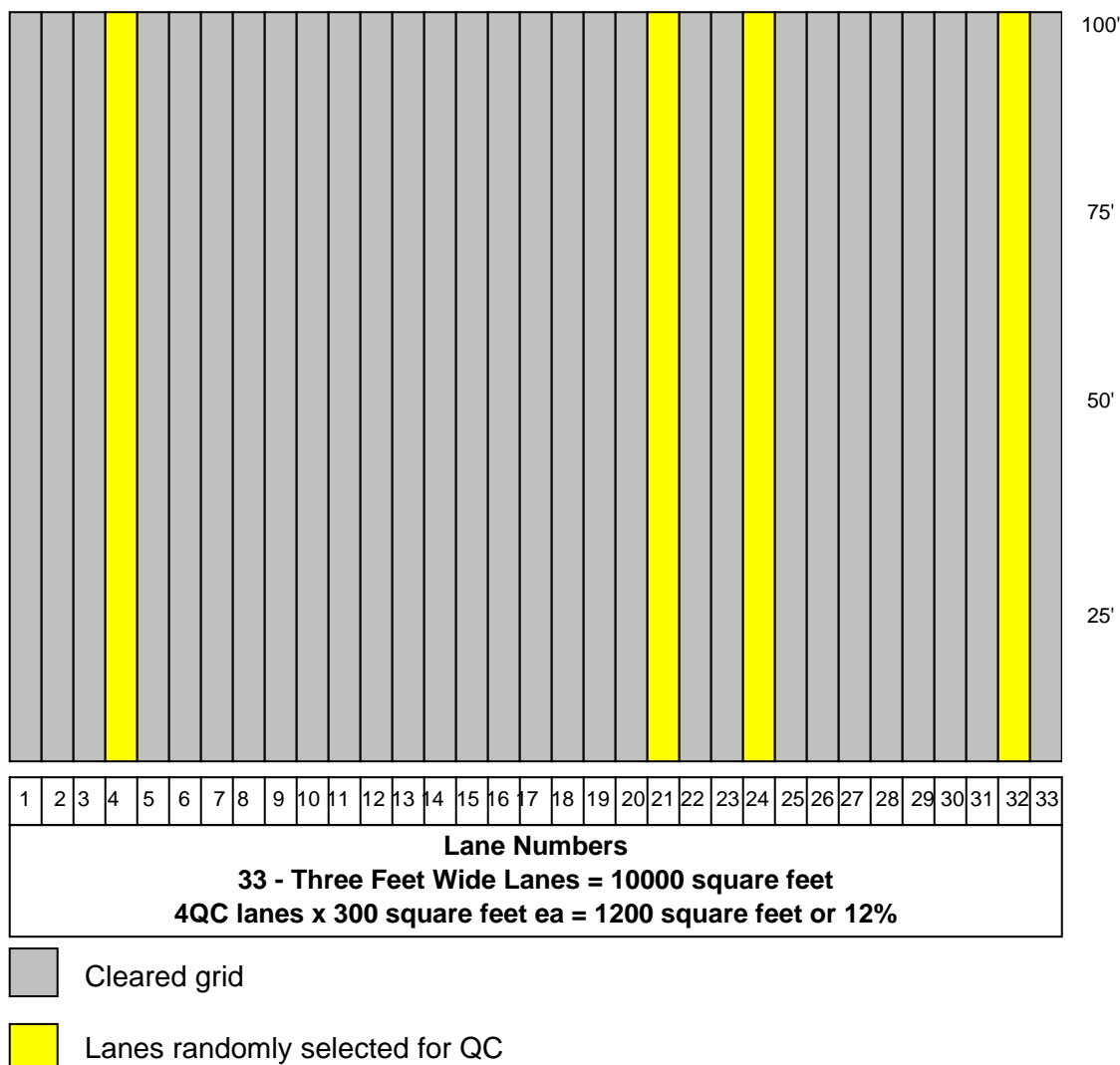
5.2.1.1 Inspection Of Geophysical Cleared Grids

After operational clearance activities are completed and the grid has been offered to QC personnel for inspection and acceptance, the UXOQCS will determine the number of lanes available for that grid (i.e. A 100 feet wide grid will have 20 five feet wide lanes). Starting at the southwest corner, the UXOQCS will number the lanes from zero to twenty. Using a computer based (Microsoft Excel) random number generator (See attachment 2), the UXOQCS will generate a number of lanes equaling the percentage of area needing inspection. In other words, to inspect 20 percent of a 100 feet by 100 feet grid (10,000 sq. ft) the random number generator will be used to select 4 lanes for inspection (2000 sq. ft) (See Figure 204-1 for an example). The QCS will then proceed to the grid to be inspected and collect digital geophysical data over those selected lanes. If a precision locating system was used during the operational clearance, it will also be used for QC purposes.

The instrument to be used during this inspection is dependent on the procedures specified in the work plan and SOW but will usually be the same instrument used in the operational clearance. If a digital geophysical data collection instrument is used for QC inspection, the collected data will be processed in the same manner as the operational data except that the QCM will nominate anomalies for investigation. After anomaly nomination, the anomaly list (dig sheet) will be sent to the QCS so that the anomalies may be investigated. The QCS will assign a surveyor to acquire the anomalies with either precision locating equipment or with tape measures, and mark the anomaly locations for later investigation. The QC excavation team will then re-acquire and excavate and identify each anomaly. The results of the investigation will be annotated on the QC Inspection Report with the following information: QC personnel, grid/area identification, random lanes selected, identification of items found with coordinates in the appropriate coordinate system as specified in the WP and SOW or x and y locations, disposition of items found. If failure criteria items are found, non-conformance/corrective action procedures will be initiated IAW section 5.4 of this ESHP.

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Figure 204-1
Example of 100' x 100' grid divided into
33 three-foot lanes.



5.2.1.2 Inspection of Mag/Dig Cleared Grids

After operational clearance activities are completed and the grid has been offered to QC personnel for inspection and acceptance, the UXOQCS will determine the number of lanes available for that grid (i.e. A 100 feet wide grid will have 20 five feet wide lanes). Starting at the southwest corner, the UXOQCS will number the lanes from zero to twenty. Using a computer based (Microsoft Excel) random number generator (See Figure 204-4 and paragraph 5.2.3), the UXOQCS will generate a number of lanes equaling the percentage of area needing inspection. In other words, to inspect 15 percent of a 100 feet by 100 feet grid (10,000 sq. ft) the random number generator will be used to select 3 lanes for inspection (1500 sq. ft) (see Figure 204-2) from the total

number of lanes available. The QCS will then proceed to the grid to be inspected and either mag and dig those selected lanes or collect digital geophysical data over those selected lanes. If a precision locating system was used during the operational clearance, it will also be used for QC purposes.

The instrument to be used during this inspection is dependent on the procedures specified in the work plan and SOW. It is possible to use digital geophysical data collection, processing, reacquisition and investigation for QC inspection instead of mag and dig. If this is the case, a like technology instrument will be used as long as the SOW and WP are satisfied (i.e. if a Schonstedt Magnetometer is used during the clearance action, a Cesium Vapor Magnetometer would be a good candidate to be used to collect digital geophysical data and if a White's All Metals Detector is used during the clearance action, an EM-61 would be a good candidate to be used to collect digital geophysical data). If a digital geophysical data collection instrument is used for QC inspection, the collected data will be processed in the same manner as the operational data except that the QCM will nominate anomalies for investigation. If a like instrument (i.e. Schonstedt or White's) is to be used for QC, the results will be annotated on the QC Inspection Report with the following information: QC personnel, grid/area identification, random lanes selected, items found with x and y locations in the appropriate coordinate system as specified in the WP and SOW, disposition of items found. If failure criteria items are found, non-conformance/corrective action procedures will be initiated IAW section 5.4 of this ESHP.

5.2.1.3 Inspection Of MD/RR

Refer to PIKA ESHP-205 Inspection and Disposal of Munitions Debris and Scrap for applicable procedures.

5.2.2 NON MIL-STD-1916 QC INSPECTION

For instance when MIL-STD 1916 based inspections are undesirable, conventional inspections will be carried out IAW this ESHP, the SOW and WP. These inspections will validate PIKA's work procedures by sampling worked product to determine its level of compliance to predetermined criteria. The QCS will inspect a minimum of 10 percent random sample of a grid OE scrap. These inspections will consist of QC personnel performing a random sampling inspection. For cleared grids, the QCS will travel to the grid being inspected and using the same type of instrument (for sub-surface clearances), randomly inspect at least 10 percent of the grid ensuring to cover the grid from bottom to top and side to side. Starting at the southwest corner and traveling a zigzag pattern from south to north and west to east can usually accomplish a sufficient coverage (See Figure 204-3 for an example search pattern). If the quality of clearance is in question, the QCS can increase the coverage area in order to assure compliance.

For OE scrap inspections, the QCS will inspect a minimum of 10 percent of all items IAW ESHP-205 Inspection and Disposal of Munitions Debris and Scrap.

Figure 204-2
Example of 100' x 100' grid divided
into 20 five-foot lanes.

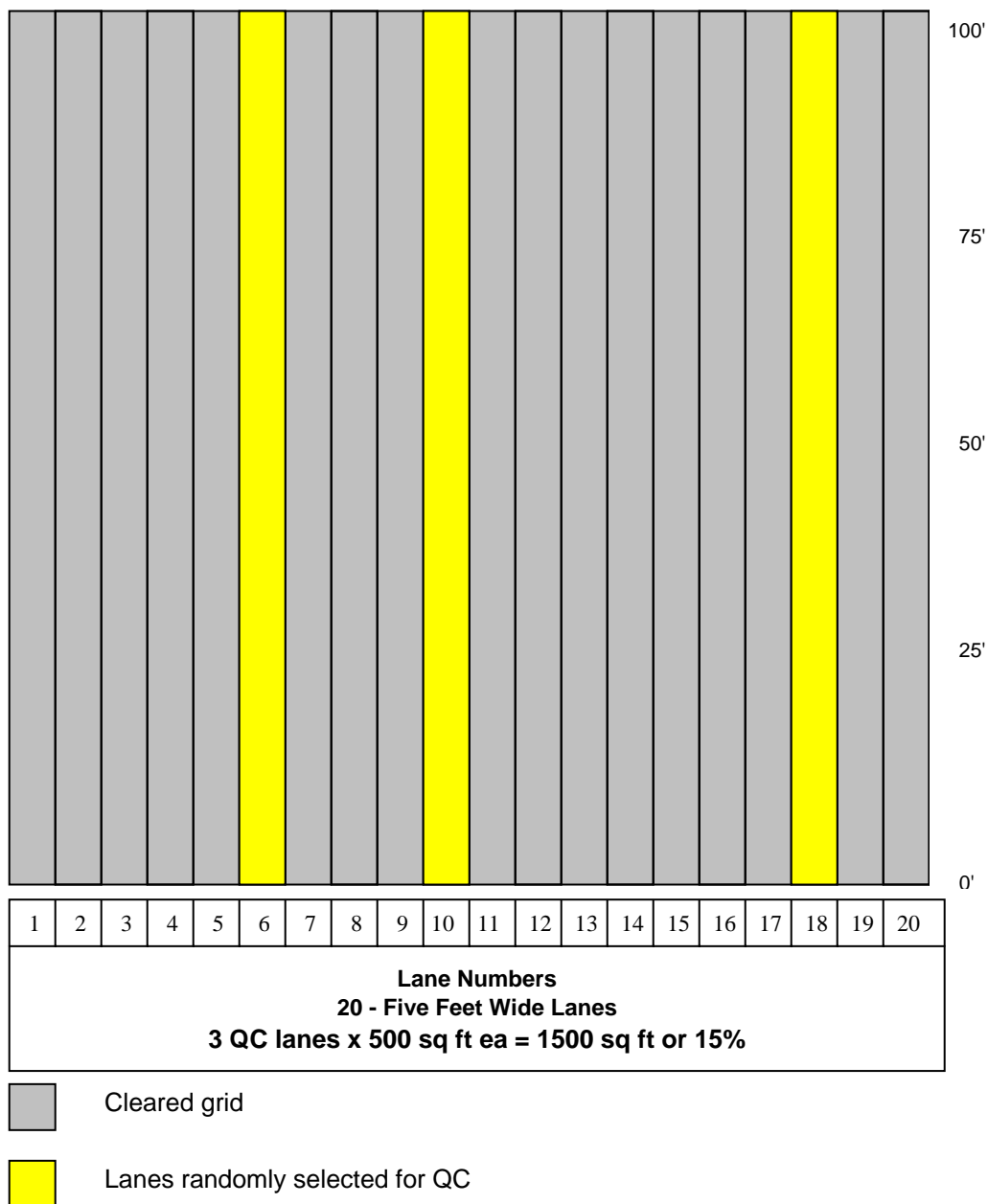
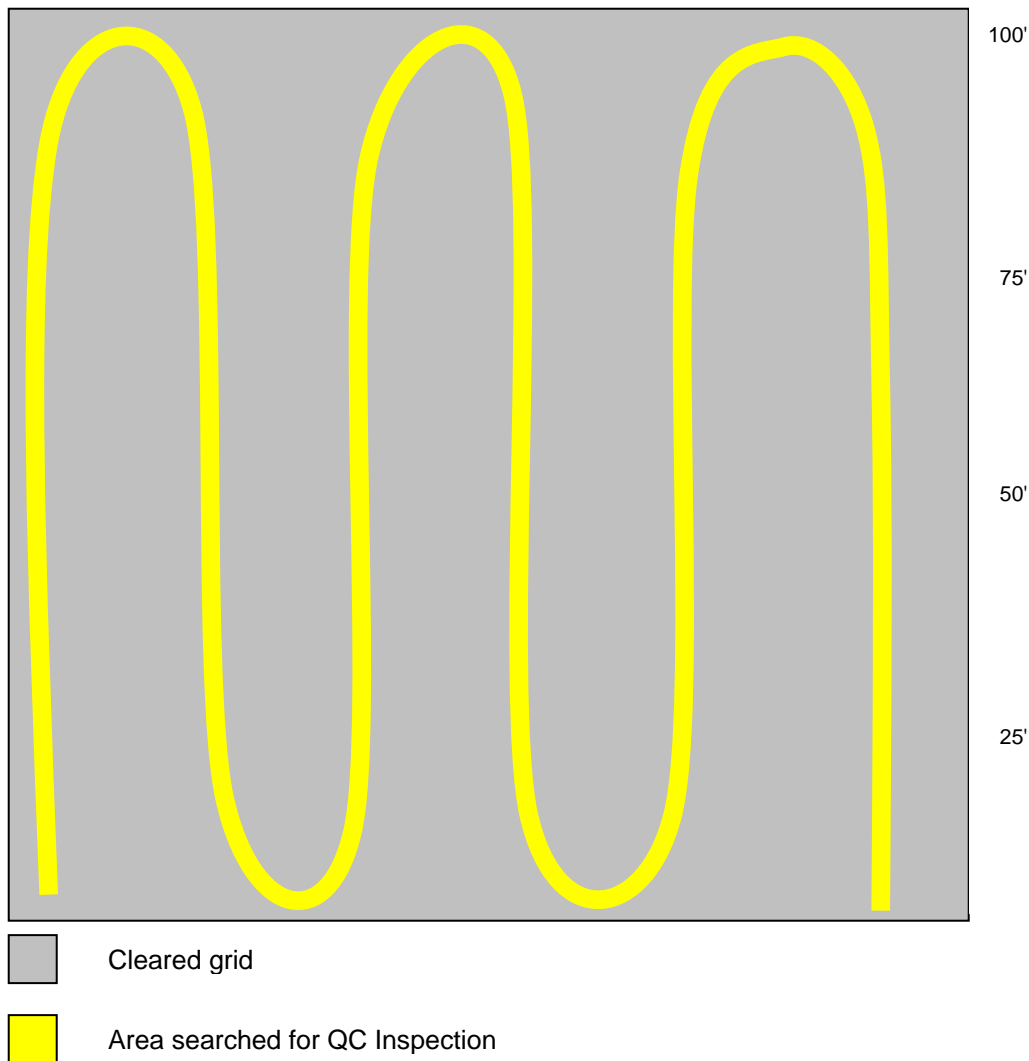


Figure 204-3
Example of 100' x 100' grid randomly
sampled using zigzag pattern.



5.3 DATA QUALITY OF GEOPHYSICAL DATA

The UXOQCS will ensure data collected by site geophysical teams is posted correctly soon after the data is collected. The QCM will then work with the geophysicist to ensure the data is complete and appropriate. During data processing, the QCM and geophysicist will ensure that the procedures are complete, appropriate and IAW the data processing ESHP. Once the data is processed and anomalies selected for investigation, the QCM will review the data and ensure anomaly selection is appropriate. If it is determined that appropriate anomalies were not selected, the QCM will select those anomalies and include them on the dig sheet. These anomalies will be identified as chosen by the QCM for later analysis. The anomaly target I.D., date of review and applicable details will be entered under the appropriate grid on the PIKA Geo Database. Once the geophysicist creates the dig sheet, it will be reviewed by the QCM for

completeness. During anomaly investigation activities, the excavation team will ensure all data blocks are completed. The QCS will review the completed dig sheet for completeness prior to it being returned to the geophysicist.

5.3.1 DELIVERABLES

Deliverable items will be reviewed for completeness and applicability by the QCM prior to submission to the customer. The date and details of this review will be documented on an PIKA QC Surveillance Report.

5.4 NONCONFORMANCE/NONCOMPLIANCE

In the event that any worked product is found by Quality Control or Quality Assurance sampling inspection not to be in conformance with acceptance standards, the product will be withheld from acceptance and distribution. In addition, that portion of the lot that has already been completed and all additional production occurring prior to initiation and validation of corrective action shall be withheld. Prior to re-inspection, the lot of non-conforming product shall be kept separate from conforming product. Once corrective actions have been validated, the nonconforming product shall be re-worked and/or re-inspected so as to ensure its conformance to acceptance criteria. These nonconformances shall be documented IAW section 5.8 of this ESHP. Any procedures or processes identified during QC surveillance activities shall be halted immediately and corrective actions initiated. Any production occurring with the nonconforming procedures shall be withheld from acceptance. Once corrective actions have been validated, the nonconforming product shall be re-worked and/or re-inspected so as to ensure its conformance to acceptance criteria.

5.5 CORRECTIVE ACTIONS

Once the non-conforming product has been identified, a Non-Conformance/Corrective Action procedure shall be initiated. This procedure will ensure immediate corrective actions take place to return any non-conforming product to a conforming status. Corrective actions may include reworking of product to ensure its conformance to acceptance standards. All non-conformance/corrective actions shall be documented IAW section 5.8 of this ESHP.

5.6 ROOT CAUSE ANALYSIS

In the event a nonconforming product or noncompliant procedure is discovered and corrective actions are taken to ensure conformity, a root cause analysis will be initiated. This analysis will be performed by a team of involved personnel such as the QCS, QCM, SUXOS, PM, Geophysicist, etc. The analysis will focus on the breakdown in approved procedures or the inadequacy of approved procedures in order to prevent like nonconforming occurrences. A key component of the analysis is capturing and successfully disseminating the information in order to be available to personnel for

preventative use. The data gathered by the analysis will be gathered by the QCM and disseminated to appropriate personnel.

5.7 LESSONS LEARNED

Lessons learned, as a component of PIKA's corrective action and root cause analysis procedures, will be captured, analyzed and disseminated in an appropriate manner as to prevent similar types of nonconformance/noncompliance. These lessons learned will be communicated to the customer with details surrounding the lesson learned.

5.8 DOCUMENTATION

All quality control function will be documented IAW the WP, SOW or this ESHP. Surveillance activities will be documented on an PIKA QC Surveillance Report. Any noncompliance identified during the conduct of surveillance activities will require an PIKA Nonconformance/Corrective Action Report be initiated. Inspections will be documented on an PIKA QC Inspection Report. If a nonconformance is identified, an PIKA Nonconformance/Corrective Action form will be initiated. Data Quality inspections/checks will be documented on the PIKA Geo/QC site specific database. Nonconformance/noncompliance and associated corrective actions will be recorded on a PIKA Nonconformance/Corrective Action Report. Root Cause Analysis' will be recorded, depending on specific circumstances, by either a surveillance report or a memorandum. Lessons learned will be documented either on PIKA Inspection, Surveillance or Nonconformance/Corrective Action Report. All site documentation will be kept at the project site and copies forwarded to the QCM for analysis, and all forms and reports referenced in this ESHP are available in the PIKA Quality Assurance Program.

6.0 AUDIT CRITERIA

The following items related to inspection, certification, and chain of custody of MD/RR items will be audited to ensure compliance with this ESHP:

- PIKA Weekly Report;
- PIKA Grid/Ordnance Tracking Log;
- PIKA QC Surveillance Report;
- PIKA QC Inspection Report; and
- PIKA Nonconformance/Corrective Action Report.

7.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to outline the accountability requirements and procedures associated with managing and processing material potentially presenting an explosive hazard (MPPEH). This criteria is intended to protect personnel and property from potential explosive hazards associated with munitions debris (MD) or range-related debris (RRD) being transferred within or released from project sites where munitions and explosives of concern (MEC) investigation or removal actions are conducted.

2.0 SCOPE

This ESHP applies to all site personnel, to include PIKA, contractor, and subcontractor personnel, who conduct operations involving the collecting, inspecting, certifying, demilitarizing, segregating, and transporting MD/RRD recovered from MEC project sites. This ESHP is not intended to contain all requirements needed to ensure compliance with Department of Defense (DoD), Department of Transportation (DOT), or Environmental Protection Agency (EPA) requirements. Consult the documents listed in Section 3.0 of this ESHP for additional regulations governing these matters.

3.0 REGULATORY REFERENCES

The following regulations outline requirements associated with managing MD/RRD collected from MEC project sites:

- US Army Engineering and Support Center, Huntsville (CEHNC) Interim Guidance Document 06-08, Corps Of Engineers Contractors MPPEH Inspection, Certification, And Final Disposition Procedures, 30 August 2006.
- DoD 6055.9-STD, DoD Ammunition and Explosive Safety Standard, Rev 5, dated 5 October 2004, with revised chapter 16 dated 14 December 2004.
- DoD Policy to Implement the EPA's Military Munitions Rule, 1 July 1998.
- 40 Code of Federal Regulations Part 261.
- DoD Directive (DOD) 4160.21-M-1 "Defense Demilitarization Manual," 14 February 1995.
- Technical Manual 11A-1-60, "Inspection of Reusable Munitions Containers and Scrap Material Generated from Items Exposed to, or Containing Explosives," 21 November 1995.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager is responsible for ensuring the availability of PIKA resources needed to implement this ESHP, and will ensure that the requirements of this ESHP are incorporated into plans, procedures, and training at sites where MD/RRD is managed.

4.2 SENIOR UXO SUPERVISOR

The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) has overall responsibility for implementing this ESHP at sites where range clearance operations include the removal of MD/RRD. The SUXOS will maintain all information related to the daily implementation of this ESHP in the Site Operational Log.

4.3 UXO SUPERVISOR

The UXO Supervisor (UXOT3) is responsible for implementing this ESHP in the field at the team level. In the absence of the SUXOS, the UXOT3 will be responsible for implementing SUXOS responsibilities outlined in Section 4.2 of this ESHP.

4.4 QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) is responsible for randomly sampling MD/RRD that has been inspected and certified by PIKA personnel as described in Section 5.1 of this ESHP. The UXOQCS ensures each item that requires demilitarization in accordance with DoD 4160.21-M-1 is appropriately demilitarized as described in Section 5.4 of this ESHP except in the case that final disposition will satisfy the demilitarization requirements. Additionally, the UXOQCS is also responsible for checking documents that track the MD/RRD from the point it is certified until it reaches its final disposition point and is released from PIKA custody as described in Section 5.5 of this ESHP.

4.5 UXO SAFETY OFFICER

The UXO Safety Officer (UXOSO) is responsible for ensuring the removal of MD/RRD with due care and attention to the hazards involved in the operation. The hazards associated with MD/RRD operations will be detailed within each project specific Site Safety and Health Plan (SSHP).

The UXOSO will ensure that the following safety measures and personal protective equipment (PPE) outlined in each SSHP are used in order to prevent or reduce accidents or injuries during the removal of MD/RRD from project sites. The requirements presented below will be implemented unless superseded by site-specific requirements imposed by the SSHP.

- Steel-toed safety boots and protective gloves will be worn whenever working with heavy MD/RRD scrap;
- Hard hats will be worn when working under overhead hoists, loaders, etc.;
- Work Gloves (leather, Kevlar or other cut/puncture resistant material) will be worn when handling MD/RRD; and
- Any PPE worn when inspecting MD will be secured to the wearer to ensure it does not fall from the worker and strike any suspect MEC items.
- Worn, torn, or discolored safety vest will be replaced with new vest.

- Approved safety glasses will be worn as applicable and in accordance with the SSHP and or the APP.

5.0 PROCEDURES

All personnel, including PIKA, contractor, and subcontractor personnel involved in processing MD/RRD removed from project sites will familiarize themselves with the procedures outlined below.

5.1 INSPECTION OF MD/RRD

All MD/RRD to be disposed of will first be 100 percent visually inspected to ensure the removal of live rounds, primers, or explosive material occurs. Items that cannot be visually inspected will be either 100 percent physically inspected (i.e., using depth gauges, mirrors, or other inspection devices), vented, or thermally treated to ensure no explosive hazards exist. All munitions fragments, such as those found dispersed within the proximity of demolition or impact ranges will be inspected for the presence of energetic contaminants.

5.1.1 Inspection Process

The inspection process for MD/RRD will involve the steps outlined below. This multi-step process will ensure that all MD/RRD that is released for disposal is free of explosive hazards.

A. UXO Specialist (UXOT2) will:

1. Inspect each item as it is recovered and determine the following:
 - Is the item a MEC or component of a military munition?
 - Does the item contain explosives or other dangerous materials?
 - Does the item require detonation?
 - Does the item require demilitarization (demil) or venting to expose internal fillers and/or cavities?
2. Segregate items requiring demil or venting procedures from those items ready for certification.
3. Items found to contain dangerous fillers will be set aside for additional processing such as demolition.

****Note:** A UXO Assistant (UXOT1) can only tentatively identify if a located item is scrap or MD. A UXOT2 will be required to inspect any located MD and make a determination if it presents an explosive hazard or not.*

B. UXO Supervisor (UXOT3) will:

1. Inspect all items recovered by the team to ensure proper segregation of scrap from MD/RRD and to confirm the condition of those items classified as free of dangerous fillers or residue.
2. Supervise detonation of items found to contain dangerous or unexposed fillers and venting/demil procedures.

3. Supervise the consolidation of recovered scrap within assigned areas.
- C. MEC scrap recovery team will:
1. Respond to scrap consolidation areas as directed by the SUXOS.
 2. Inspect all items before placing them into transport vehicle.
 3. Determine separation requirements of material recovered. (i.e., scrap that resembles ordnance, sort by metal types, MD requiring processing, etc.).
 4. Deliver all scrap to appropriate area and secure to prevent commingling with inspected and certified scrap.
- D. UXOQCS will:
1. Conduct surveillances of the procedures used by MEC teams and individuals for processing MD or Range Residue.
 2. Perform and document, a minimum of 10% (100% in some cases), random sampling of all MD/RRD collected from the various teams to ensure no items of a dangerous or explosives nature are identified as scrap metal. The UXOQCS performs these random checks to satisfy the UXOQCS that the MD/RRD is free from any explosive hazards, necessary for completion of the required documentation.
 3. Inspect the prepared documentation. At a minimum, the Requisition and Turn-in DOD document form, DD 1348-1A and PIKA's MD/RRD INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM.
- E. UXOSO will:
1. Ensure the specific procedures and responsibilities for processing MD/RRD for certification are being followed and performed safely.
 2. Confirm that operations are compliant with the SSHP and consistent with applicable regulations and guidance and in accordance with the USACE approved project work plan.
 3. Will perform random checks of processed MD/RRD to ensure items being identified as scrap are safe and free from any explosive hazards.
- F. SUXOS will:
1. Be responsible for ensuring Work and Quality Control (QC) Plans specify the procedures and responsibilities for processing MD/RRD for the final disposition as scrap metal.
 2. Ensure a Requisition and Turn-in Form, DD Form 1348-1A is completed for all MD/RRD to be transferred.
 3. Perform random checks to ensure that the MD or range residue is free from explosive hazards, necessary to complete the DD 1348-1A.
 4. Certify all scrap metal generated from MD or Range Residue as free of explosive hazards or other dangerous material.
 5. Be responsible for ensuring that inspected materials are secured in a closed, labeled and sealed container and documented as follows:

- a. The container shall be closed and clearly labeled on the outside with the following information: The first container will be labeled with a unique identification that shall start with USACE (if appropriate)/Installation Name/PIKA International, Inc./0001/Seal's unique identification and continue sequentially.
- b. The container shall be sealed, in such a manner, that the seal must be broken in order to open the container. The seal shall bear the same unique identification as the container or the container shall be clearly marked with the seal's identification, if different than the container.
- c. A MD/RANGE RESIDUE INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM will be provided to the customer and scrap disposal company. The following information for each container will be provided; weight of container; location where MD/RRD was obtained; name of contractor, names of certifying and verifying individuals; unique container identification; and seal identification, if required. This documentation will be included in the final report.

5.2 MARKING AND PACKAGING

Cartridge and flare cases, fuzes, primers, boosters, practice ordnance, and small pieces/fragments from all types of high explosive ordnance and other similar items DO NOT require individual marking. These items will be inspected, placed in containers, then secured with steel band(s) or tagged with an appropriate seal or similar device having a serial number. When large amounts of residue are generated, steel hoppers may be used, provided the hopper has a lid/cover that can be secured and sealed after inspection. **Any evidence of tampering after sealing will require re-inspection and re-certification.** Containers/hoppers will be marked as in paragraph 5.1.1.f. (5) above. Where quantities permit, the contents will be separated by base metal type (i.e., copper, aluminum, steel, etc.) and tagged or marked to identify contents. Large MD/RRD that cannot be containerized or palletized will be individually inspected and marked similarly. Each will be tagged with a "railroad seal" or similar device having a serial number. When large items are further demilitarized, by smelting, disassembly, breaking, crushing, shredding, or cutting, additional stamping or marking of individual pieces is not required.

5.3 MD/RRD SCRAP CERTIFICATION AND VERIFICATION

PIKA will ensure that MD/RRD generated from MEC project sites is properly inspected in accordance with the procedures in 5.1 above. Only personnel who are qualified UXO personnel per the U.S. Army Corps of Engineers Data Item Description (DID) OT-025 will perform these inspections. The SUXOS will certify, and the client representative will verify, that the MD/RRD is free of explosive hazards.

DD form 1348-1A will be used as documentation. All DD 1348-1A forms must clearly show the typed or printed names of the SUXOS and the client representative, organization, signature, and contractor's home office and field office phone number(s) of the persons certifying and verifying the MD/RRD.

- a. Local directives and agreements may supplement these procedures. Coordination with the local concerns will identify any desired or requested supplement to these procedures.
- b. In addition to the data elements required and any local agreed to directives, the DD 1348-1A must clearly indicate the following for scrap metal:
 - (1) Basic material content (Type of metal; e.g., steel, aluminum, brass, or mixed)
 - (2) Estimated weight
 - (3) Unique identification of each of the containers and seals stated as being turned over.
 - (4) Location where MD scrap was obtained. (Site or Range Number)
 - (5) Seal identification, if different from the unique identification of the sealed container.
- c. The following certification will be entered on each DD 1348-1A for turn over of scrap generated from MD or Range Clearance operations and will be signed by the SUXOS and the client representative. If there is no client representative on the project, the SUXOS will be the verifier and the UXOQCS will be the certifier.

"This certifies that the MD residue, Range Residue and/or Explosive Contaminated Property listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards."

5.4 DEMILITARIZATION

When required by DoD 4160.21-M-1, or the Scope of Work where this directive is not applicable, MD/RRD will be demilitarized before being released from PIKA custody. The purpose of demilitarization is to render any item unusable and/or unrecognizable as a military article. Explosives or mechanical means can be used to demilitarize an item.

5.5 CHAIN OF CUSTODY

The containers/hoppers and individual pieces of MD/RRD must be under the control and custody of PIKA from the time each is inspected and certified until each is turned over to the smelter or recycler for final disposition. PIKA Form ESHF-204 will be used to document this chain of custody. ESHF-204 identifies the quantity, composition, origin, routing, and destination of each container/hopper or item during its handling and transportation life cycle. It also provides evidence that all containers/lots were properly segregated and secured at all times until final disposition. At random times during the scrap process, photographs of a representative sample of containers/lots will be taken by PIKA personnel, to verify that this ESHP is being followed.

5.6 FINAL DISPOSITION

The certified and verified MEC scrap will only be released to an organization that will:

- a. 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 agree with the provided documentation that the sealed containers contained no explosive hazards when received. This shall be signed on company letterhead 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.
- b. Send notification and supporting documentation to PIKA that the contents of the sealed containers have been smelted and are now only identifiable by their basic content.
- c. This document will be incorporated into the final report as documentation for supporting the final disposition of this scrap metal.

6.0 AUDIT CRITERIA

The following items related to inspection, certification, and chain of custody of MD/RRD items will be audited to ensure compliance with this ESHP:

- Requisition and Turn-in Form, DD Form 1348-1A completed for all scrap metal to be transferred;
- Copies of PIKA Form ESHF-204 for each container/hopper or item;
- Daily Task and Safety Briefing Logs (ESHF-502);
- Documentation of Hazard Communication Training Form (ESHF-505);
- Safety Training Attendance Log (ESHF-503); and
- Daily Inspection and Weekly Audit Report Form (ESHF-506).

7.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide the minimum procedures and safety and health requirements applicable to the acquisition, storage, and accountability of explosives and munitions and explosives of concern (MEC). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of operations on a site where explosives are utilized or MEC contamination is encountered. This ESHP is not intended to contain all requirements needed to ensure compliance. Consult the documents listed in section 3.0 of this ESHP for additional compliance issues.

3.0 REGULATORY REFERENCES

This ESHP has been designed to address the safety and health concerns associated with the acquisition, storage and accountability of explosives and MEC. This ESHP will be used in conjunction with PIKA ESHP-203, Transportation of Explosives, and the applicable specifications of the Occupational Safety and Health Administration (OSHA) standards and US Army Corps of Engineers (USACE) requirements listed below. Additional Federal regulations are also presented below, and in the event other hazards are associated with the conduct of this ESHP, consultation of other PIKA ESHPs may be needed.

- OSHA 29 CFR 1910 General Industry Standards
- OSHA 29 CFR 1926 Construction Standards
- Department of Defense (DoD) 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*. 5 October 2004, with approved changes 14 December 2004.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, *Safety and Health Requirements Manual*, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.
- USACE EP-75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic, or Radiological Waste (HTRW) and Construction Activities*, 1 August 2004.
- USACE, EM 385-1-4009, *Military Munitions Response Actions*, 15 June 2007.

- American conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®), 2007.
- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985. (DHHS (NIOSH) Publication No. 85-115).
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, *Methodologies for Calculating Primary Fragment Characteristics*, 1 December 2003.
- DDESB TP 18, *Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel*, 20 December 2004.
- USACE, ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* 1 May 2007.
- Procedures for *Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, U.S. Army Engineering and Support Center, Huntsville, August 1998.
- Alcohol Tobacco and Firearms (ATF) P 5400.7, *ATF-Explosives Law and Regulations* (most current version).
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

4.0 RESPONSIBILITIES

4.1 CORPORATE ENVIRONMENTAL SAFETY AND HEALTH MANAGER

The Corporate Environmental Safety and Health Manager (CESHM) is responsible for the continued development, improvement, and implementation of the PIKA CESHP and this ESHP. To accomplish this end, the CESHM will be responsible for:

- Conducting an annual review of this ESHP and making modifications as necessary;
- Developing or reviewing site plans that require the acquisition, storage and accountability of explosives and ensuring the requirements of this ESHP are incorporated in the site plans;
- Providing the UXO Safety Officer (UXOSO) with consultation related to MEC storage and protective measures; and
- Periodically auditing PIKA work sites to ensure compliance with this ESHP.

4.2 PROJECT MANAGER

The Project Manager (PM), in conjunction with the Senior UXO Supervisor (SUXOS), will be responsible for evaluating the initial quantity and type of demolition materials to be ordered for MEC Response Action operations. When possible, the initial requisition should be of sufficient quantity to support the project for a 90-day period. The PM will be responsible for ensuring the acquisition of demolition supplies and explosives from recognized and licensed sources. Additionally, the PM will ensure the availability and

management of the PIKA resources needed to acquire, store and account for the explosives.

4.3 SENIOR UXO SUPERVISOR

The SUXOS will be responsible assisting the PM with the initial explosives acquisition and for the ordering of all subsequent demolition materials. The SUXOS will generate a purchase order (PO) request through the PM, who will approve the PO and submit it to accounting for placement of the order. The SUXOS will then be responsible for the proper receipt, storage, and accountability of the explosives received on site, and for tracking usage of explosives. The SUXOS will also be responsible for the proper storage and accountability of MEC items that may be stored at the site.

4.4 UXO SAFETY OFFICER

For sites where MEC hazards exist or explosives are utilized, PIKA will field a UXO Safety Officer (UXOSO) who meets the training and experience requirements of DDESB TP 18. The UXOSO will be responsible for ensuring that the explosive safety requirements outlined in this ESHP and the references in paragraph 3.0 of this ESHP. The UXOSO will ensure that the hazards and control techniques associated explosive acquisition and storage are discussed during the initial site hazard training and the daily tailgate safety briefings. The UXOSO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this ESHP and other regulatory guidelines.

5.0 REQUISITION PROCEDURES

The requisition of explosives will be in accordance with PIKA's purchasing policy to ensure the best possible price for the task. Of paramount importance in this process is the determination of the location of the supplier(s). Generally, response time to requisitions is better for those suppliers closest to the site. Additionally, there is the possibility of leasing explosives magazines from the supplier however, it will remain the responsibility of the PM and UXOSO to ensure all regulatory requirements are met to the greatest extent practicable. Magazines must meet the requirements of 27 CFR 55 and each magazine must have a Net Explosive Weight (NEW) and hazard classification established for the explosives to be stored. The NEW is calculated in accordance with the procedures identified in DA Pam 385-64.

6.0 LICENSE/PERMIT

6.1 FEDERAL LICENSE

In order to requisition explosives, PIKA will have a valid Bureau of Alcohol Tobacco and Firearms (BATF) license/permit on hand, to include an Explosives Purchase/Receipt/Transportation Authorization List (ESHP-202) for the receipt of explosives. These two

documents must be on file at the PIKA corporate office, the project site, and each explosives supplier must also have a copy of each in order to sell to PIKA.

6.2 STATE BLASTERS LICENSE

If required by the state in which a project is being conducted, PIKA personnel will obtain a state blaster's license. This will usually be accomplished by contacting the State Fire Marshall or Safety Office to determine the requirements and schedule for the test. Only those individuals licensed by the State may actually initiate the demolition shot. The PIKA PM and SUXOS will be responsible for identifying the need to obtain a blaster's license for a given project and for scheduling the personnel resources needed to obtain the requisite license.

6.3 STATE/COUNTY PERMITS

In some instances, it is necessary to obtain a state or county permit to conduct open burn/open detonation. This is accomplished by contacting the State Fire Marshall or County Fire Department for instructions.

7.0 EXPLOSIVES RECEIPT

Only those individuals named on the Authorization list may sign for explosives from the shipper. In order to ensure the quantity shipped is the same as the quantity listed on the shipping documents, two PIKA personnel will inventory the shipment prior to signing for its receipt.

7.1 SHIPPING DOCUMENTS

The explosive suppliers Bill of Lading (B/L) and the freight companies shipping document generally accompany explosive shipments (see PIKA Form ESHF-201). The initial inventory will include reconciling the two documents with the actual shipment and creating an on-site record that includes these documents and the inventory records. Regardless of the outcome of the initial inventory, one copy of the B/L and the freight company's shipping document will be attached to a copy of the PO request 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.

7.2 RECEIPT DISCREPANCIES

In the event there is a discrepancy between the amount shipped and the amount received, the SUXOS will immediately contact the explosive supplier and inform the supplier of the discrepancy. It is then the responsibility of the supplier and shipper to rectify the situation and inform PIKA of the results. The supplier and/or shipper must then correct their documents and forward the corrected documents to the site. In all cases, only the amount received will be entered on the Explosives Accountability Record/Magazine Data Card (ESHF-203).

8.0 EXPLOSIVES STORAGE

Demolition operations require the availability and storage of explosive demolition materials. To the maximum extent possible, local government or existing facilities will be used. Existing facilities are desirable due to their low cost and pre-approval, negating transport and set up. PIKA will comply with local storage procedures when using Government facilities. When required to provide explosive storage facilities, PIKA will:

- Use approved ATF Type 2 outside storage structures or government furnished magazines;
- Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards, 27 CFR 55, 29 CFR 1910.1201 and all local, and state requirements to the greatest extent;
- Install a lightning protection system (LPS) and grounding, and have it checked by an electrician for specification conformance. Inspection and testing criteria are contained in DA Pam 385-64;
- A physical security survey will be conducted in accordance with AR 190-11 to determine if fencing or guards are required. Establish security, such as fencing and lighting as needed, to prevent unauthorized access and theft.

8.1 MAGAZINES

Generally, Type 2 outdoor magazines conforming to the standards set forth in Section 55.206 of ATFP 5400.7, Alcohol, Tobacco, and Firearms (ATF) Explosives Law and Regulations will be used, which will consist of a box, trailer, semi-trailer, or other mobile facility. Type 2 magazines are bullet, fire, weather, and theft-resistant and must be well ventilated. The ground around outdoor magazines must slope away for drainage or other adequate drainage provided. When unattended, vehicular magazines must have wheels removed or otherwise be effectively immobilized by using pin-locking devices.

8.1.1 Exterior Construction

The exterior and doors are to be constructed of not less than 1/4-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.

8.1.2 Hinges and Hasps

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

8.1.3 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 to prevent sawing or lever action on the locks, hasps, and staples.

8.1.4 Signs/Placards

The BATF and the Department of Defense (DoD) require that all magazines be appropriately posted to indicate the hazard class of the contents, the fire fighting hazards and the emergency notification list. Magazines will be placarded in accordance with DOD 6055.9-STD and DA Pam 385-64. This will require that the magazine area be posted for the most hazardous items stored in the magazine area. For example, a Fire Division Class 1 is needed for recovered MEC, and a Fire Division Class 3 for the demolition material, excluding detonators, which are Fire Division Class 4. If there are two fire division or hazard class items in the same magazine, use the higher hazard division/class placard.

8.1.5 Lightning Protection

For Base Realignment and Closure (BRAC) and active military facilities, appropriate lightning protection will be installed in accordance with Chapter 7 of DOD 6055.9-STD. Army installations will also meet the provisions of DA Pamphlet 385-64. For Formerly Used Defense Sites (FUDS) where existing storage facilities are typically not available, lightning protection is not required if the following criteria are met

- The magazine is constructed of metal that is 3/16-inch steel or larger (reference Appendix L of NFPA 780), and
- The magazine is grounded IAW NFPA requirements, and
- The all parts of the magazine are located at least 6.5 feet from the nearest fence.

8.1.6 Emergency Notification List

An emergency notification list containing the name, telephone number and local address 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.

8.1.7 Compatibility

Explosive compatibility will be maintained. Table No. 206-1 lists the various storage compatibility groups and Table No. 206-2 is the compatibility chart. These tables are extracts from Section 4 of DA PAM 385-64. In certain instances, it may be necessary to store incompatible items in the same magazine. If this should occur, then a barricade, such as sandbags, within the magazine, will physically separate the incompatible items. This situation should be an interim occurrence to be avoided if possible, and for DoD projects will be approved by the DDESB prior to implementation.

8.1.8 Key Control

Magazines will remain locked except when explosive receipt, issue or accountability operations are being conducted. The two locks on the magazines will require two different keys to unlock. The SUXOS will maintain one copy of the key, and will designate control of the second key to the UXOSO, the UXO Quality Control Specialist UXOQCS, or a UXO Technician III assigned as the demolition supervisor (DS). This procedure ensures that access to the magazines cannot be made without obtaining the two keys and no one individual can gain access to the magazines.

**TABLE 206-1: STORAGE COMPATIBILITY GROUPS FOR
EXPLOSIVES AND AMMUNITION**

Group A
Bulk initiating explosives that have the necessary sensitivity to heat, friction, or percussion to make them suitable for use as initiating elements in an explosives train. Examples are wet lead azide, wet lead styphnate, wet mercury fulminate, wet tetracene, dry cyclonite (RDX), and dry pentaerythritol tetranitrate (PETN).
Group B
Detonators and similar initiating devices not containing two or more independent safety features. Items containing initiating explosives that are designed to initiate or continue the functioning of an explosives train. Examples are detonators, blasting caps, small arms primers, and fuzes.
Group C
Bulk propellants, propelling charges, and devices containing propellant with or without their own means of ignition. Items that, upon initiation, will deflagrate, explode, or detonate. Examples are single-, double-, triple-base and composite propellants, rocket motors (solid propellant), and ammunition with inert projectiles.
Group D
Black powder, high explosives (HE), and ammunition containing HE without its own means of initiation and without propelling charge, or a device containing initiating explosives and containing two or more independent safety features. Ammunition and explosives that can be expected to explode or detonate when any given item or component thereof is initiated except for devices containing initiating explosives with independent safety features. Examples are bulk trinitrotoluene (TNT), Composition B, black powder, wet RDX or PETN, bombs, projectiles, cluster bomb units (CBUs), depth charges, and torpedo warheads.
Group E
Ammunition containing HE without its own means of initiation and with propelling charge (other than one containing a flammable or hypergolic liquid). Ammunition or devices containing HE and containing propelling charges. Examples are artillery ammunition, rockets, or guided missiles.
Group F
Ammunition containing HE with its own means of initiation and with propelling charge (other than one containing a flammable or hypergolic liquid) or without a propelling charge. Examples are grenades, sounding devices, and similar items having an in-line explosives train in the initiator.
Group G
Fireworks, illuminating, incendiary, and smoke, including hexachloroethane (HC) or tear-producing munitions other than those munitions that are water activated or which contain white phosphorous (WP) or flammable liquid or gel. Ammunition that, upon functioning, results in an incendiary, illumination, lachrymatory, smoke, or sound effect. Examples are flares, signals, incendiary or illuminating ammunition, and other smoke or tear-producing devices.
Group H
Ammunition containing both explosives and WP or other pyrophoric material. Ammunition in this group contains fillers which are spontaneously flammable when exposed to the atmosphere. Examples are WP,

**TABLE 206-1: STORAGE COMPATIBILITY GROUPS FOR
EXPLOSIVES AND AMMUNITION**

plasticized white phosphorous (PWP), or other ammunition containing pyrophoric material.
Group J
Ammunition containing both explosives and flammable liquids or gels. Ammunition in this group contains flammable liquids or gels other than those which are spontaneously flammable when exposed to water or the atmosphere. Examples are liquid- or gel-filled incendiary ammunition, fuel-air explosives (FAE) devices, flammable liquid-fueled missiles, and torpedoes.
Group K
Ammunition containing both explosives and toxic chemical agents. Ammunition in this group contains chemicals specifically designed for incapacitating effects more severe than lachrymation. Examples are artillery or mortar ammunition (fuzed or unfuzed), grenades, and rockets or bombs filled with a lethal or incapacitating chemical agent.
Group L
Ammunition not included in other compatibility groups. Ammunition having characteristics that do not permit storage with dissimilar ammunition belong in this group. Examples are water-activated devices, prepackaged hypergolic liquid-fueled rocket engines, certain FAE devices, triethylaluminum (TEA), and damaged or suspect ammunition of any group. Types presenting similar hazards may be stored together but not mixed with other groups.
Group N
Ammunition containing only extremely insensitive detonating substance (EIDS). Examples are bombs and warheads.
Group S
Ammunition presenting no significant hazard. Ammunition so packaged or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not hinder firefighting significantly. Examples are thermal batteries, explosives switches or valves, and other ammunition items packaged to meet the criteria of this group.

TABLE 206-2: STORAGE COMPATIBILITY CHART

GROUPS	A	B	C	D	E	F	G	H	J	K	L	S
A	X	Z										Z
B	Z	X										X
C			X	Z	Z		Z					X
D			Z	X	X							X
E			Z	X	X							X
F						X						X
G			Z				X					X
H								X				X
J									X			X
K										X	U	
L										U		
S	Z	X	X	X	X	X	X	X	X			X

Notes:

- The marking "X" at an 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. 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.
4. 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.
5. The marking "U" on above chart indicates that leaking toxic chemical munitions of one agent type, i.e., G-B, with or without explosive components, may be stored together in one magazine specifically designated for storage of leakers of that agent type.
6. Ammunition designated "PRACTICE" by NSN and nomenclature may be stored with the fully loaded ammunition it simulates.

9.0 EXPLOSIVES ACCOUNTABILITY

Upon receipt and verification of explosive demolition material, the Explosives Accountability Record/Magazine Data Card (ESHF-203) is completed and kept in the magazine on top of the listed item. A duplicate copy is maintained by either the UXOSO or the UXOQCS.

9.1 USAGE INVENTORY

Following each occurrence of a receipt or issue of explosive material, the SUXOS will conduct a joint inventory in conjunction with the DS drawing out or returning the explosives. Only those items issued/returned will be inventoried. The SUXOS will appropriately annotate the two sets of magazine data cards.

9.2 WEEKLY INVENTORY

The last day of each work week, the SUXOS, the UXOSO or the UXOQCS, and a third individual (who will be changed each week) will conduct an inventory and record results on the two sets of magazine data cards.

9.3 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 PIKA PM, and the BATF will be notified. All actions from this point will be dictated by the BATF.

10.0 AUDIT CRITERIA

The following items related to explosives acquisition, storage, accountability and transport shall be audited to ensure compliance with this ESHP:

- The PIKA Demolition Shot Record (ESHF-205);
- The Daily Task and Safety Briefing Logs (ESHF-502);
- The Daily Inspection and Weekly Audit Report Form (ESHF-506); and
- The Explosives Accountability Record/Magazine Data Card (ESHF-203).

11.0 ATTACHMENTS

None.

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) 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). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP).

2.0 SCOPE

This ESHP applies to all site personnel, including contractor and subcontractor personnel, involved in the conduct of MEC demolition/disposal operations on a MEC contaminated site. This ESHP 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 ESHP for additional compliance issues.

3.0 REGULATORY REFERENCES

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

- OSHA 29 CFR 1926 Construction Standards (notably 29 CFR 1926 Subpart U, Blasting and the Use of Explosives).
- Department of Defense (DoD) 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*. 5 October 2004, with approved changes 14 December 2004.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, *Safety and Health Requirements Manual*, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.
- USACE EP-75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic, or Radiological Waste (HTRW) and Construction Activities*, 1 August 2004.
- USACE, EM 385-1-4009, *Military Munitions Response Actions*, 15 June 2007.
- American conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®), 2007.

- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985. (DHHS (NIOSH) Publication No. 85-115).
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, *Methodologies for Calculating Primary Fragment Characteristics*, 1 December 2003.
- USACE, ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* 1 May 2007.
- Procedures for *Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, U.S. Army Engineering and Support Center, Huntsville, August 1998.
- Applicable sections of DOT, 49 CFR Parts 100 to 199.
- Bureau of Alcohol Tobacco Firearms and Explosives (BATFE) 5400.7, Alcohol Tobacco and Firearms Explosives Laws and Regulations.
- The PIKA CESHP (this document will be on site and available to site personnel during the project).

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

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

4.2 SENIOR UXO SUPERVISOR

The Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) will be responsible for assuring that adequate safety measures and housekeeping are taken during all phases of site operation, to include demolition activities, and shall visit site demolition locations as deemed necessary to ensure that demolition operations are carried out in a safe, clean, efficient and economical manner.

4.3 DEMOLITION SUPERVISOR

Prior to initiation of demolition operations, the SUXOS shall designate an experienced and trained UXO Supervisor to act as the Demolition Supervisor (DS). The DS shall be present during all demolition operations or designate a competent, qualified person to be in charge during any absences. The demolition activities shall then be conducted under the direct control of the DS, who will have the responsibility of supervising all demolition operations within the area. The DS shall be responsible for providing a pre-demolition briefing as outlined in paragraph 8.1 of this ESHP. The DS will also ensure that all applicable forms, documentation, and records required by this ESHP are

completed and signed by appropriate project personnel. The DS will ensure that the logs and records accurately reflect the demolition events conducted and the demolition materials used during that day's operations.

4.4 SITE SAFETY AND HEALTH OFFICER

The SSHO for the site is responsible for ensuring that all demolition operations are being conducted in a safe and healthful manner. As such, an PIKA employee designated as the demolition SSHO will be present on-site during all MEC demolition operations and the SSHO will meet the requirements for a UXO Safety Officer as expressed in DDESB TP 18 listed above in paragraph 3.0 or this ESH-207. However, in the event that a given project has multiple sites where varying types of MEC investigation and remediation operations are being conducted concurrently, it may be necessary to assign an additional, temporary SSHO to monitor the demolition operations. The temporary demolition SSHO will ensure the compliance of the demolition team while the primary SSHO attends to the remaining project teams. If there is no temporary SSHO assigned strictly to demolition operations, the primary site SSHO will be the one responsible for monitoring demolition operations.

4.5 QUALITY CONTROL SPECIALIST

The UXO Quality Control Specialist (UXOQCS) is responsible for ensuring the completeness of demolition operations and for weekly inspecting the Explosives Accountability Record/Magazine Data Card (ESH-203), the PIKA Demolition Shot Record (ESH-205), and the inventory of MEC and demolition material. The UXOQCS, assisted by demolition team personnel, will inspect each demolition pit and an area of up to 250 feet in radius after each demolition shot to ensure there are no kick outs, hazardous MEC components or other hazardous items remaining after the demolition shot. In addition, the pit will be checked with a magnetometer and large metal fragments, and any hazardous debris will be removed on a per use basis IAW the SOW. Any MEC discovered during the QC check will be properly disposed of using the demolition procedures in the WP. MEC items that have been exposed to the forces of demolition detonations will not be moved and will be disposed of in place using the approved procedures in the project WP.

5.0 GENERAL OPERATIONAL AND SAFETY PROCEDURES

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, the general safety provisions listed below shall be followed by all demolition personnel, at all times. Non-compliance with the general safety provisions

listed may result in positive discipline, to include termination of employment. The safety provisions for demolition operations include:

- Demolition operations shall be conducted IAW this ESHP and any approved changes outlined in the approved WP.
- Complying with all safety regulations applicable to demolition range activities, demolition materials, and MEC materials.
- Demolition of any kind is prohibited without the express permission from the client.
- The quantity of MEC to be destroyed during any single shot will be determined by the range limit net explosive weight (NEW) and other considerations outlined in the project WP.
- For projects where MEC items may be consolidated for demolition, the US Army Engineering and Support Center, Huntsville (CEHNC), document entitled "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites" dated August 1998 (updated March 2000) will be located on-site and followed when destroying multiple munitions by detonation on site.
- In the event of an electrical storm, or heavy snow or dust storms, immediate action will be taken to cease all demolition range 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 department 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 to the SSHO all injuries, accidents or near misses that occur during demolition operations.
- Employees will not tamper with any safety devices or protective equipment.
- Any defect or unusual condition noted that is not covered by this ESHP will be reported immediately to the DS or SSHO, and operations will be halted until the condition is addressed and resolved.
- 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 natural fiber, close-weave clothes, such as cotton. Synthetic material such as nylon is not authorized unless treated with anti-static material.
- Consistent with PIKA's operational policies, exposures to demolition hazards shall be maintained to the fewest number of personnel, for the shortest time, and to the least amount of hazard.
- Work locations will be maintained in a neat and orderly condition.
- All hand tools shall be inspected prior to use, and maintained in a good state of repair.

- All heavy equipment use in support of the demolition operations and all heavy operators will meet the requirements of PIKA ESHP-518.
- Equipment and other lifting devices designed and used for lifting will have the load rating and date of next inspection marked on them. The load rating will not be exceeded and the equipment will not be used without a current inspection date.
- Leather or leather-palmed gloves will be worn when handling wooden boxes, munitions or MEC.
- Lifting and carrying require care. Improper methods cause unnecessary strains. Observe the following preliminaries before attempting to lift or carry:
 - a. When lifting, keep your arms and back as straight as possible, bend your knees and lift with your leg muscles, and
 - b. Be sure you have good footing and hold, and lift with a smooth, even motion.
- Telephone and/or radio communications with off-site resources shall be available and maintained through out demolition operations.
- Motor vehicles and material handling equipment (MHE) used for transporting MEC or demolition materials must meet the following requirements:
 - a. Exhaust systems shall be kept in good mechanical repair at all times.
 - b. Lighting systems shall be an integral part of the vehicle.
 - c. One Class ABC rated, portable fire extinguisher shall, if possible, be mounted on the vehicle outside of the cab, on the driver's side, and one Class ABC fire extinguisher shall be mounted inside the cab.
 - d. Wheels of carriers must be chocked and brakes set during loading and unloading.
 - e. No demolition material or MEC shall be loaded into or unloaded from, motor vehicles while their motors are running.
- Motor vehicles and MHE used to transport demolition material and MEC shall be inspected prior to use to determine that:
 - a. Fire extinguishers are filled and in good working order.
 - b. Electrical wiring is in good condition and properly attached.
 - c. Fuel tank and piping are secure and not leaking.
 - d. Brakes, steering and safety equipment are in good condition.
 - e. 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.
- Employees are required to wear leather or rubber gloves when handling demolition materials. The type of glove worn is dependent on the type of demolition material.
- If a designated demolition range is established and used, a red warning flag, such as a "Bravo Flag" or a windsock, will be displayed at the entrance to the demolition range during demolition operations. If a gate is available, the

entrance gate shall be either guarded or locked when demolition work is in process.

- All demolition shots will be performed IAW with any engineering controls (i.e., soil tamping or sandbags) outlined in the project WP.
- 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 on the demolition range while the pit is primed or during the priming process. The charts shown in Tables 207-2 and 207-3 (located at the end of this document) shall be used to calculate minimum safe distances as they relate to mobile RF, television and FM broadcasting transmitters when electric detonators are in use.
- 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 range).
- For established demolition ranges, a minimum area of 200 feet in diameter around the demolition pit shall be cleared of dry grass, leaves, and other combustible materials.
- 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 persons shall ride in a truck transporting demolition material or MEC, and no person shall be allowed to ride in the trailer/bed.
- Vehicles shall not be refueled when carrying demolition material or MEC, and if they must be refueled near such materials, the vehicle will be a minimum of 100 feet from magazines or trailers containing such items before refueling can occur.
- All explosive vehicles 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.
- For established demolition ranges, demolition pits shall be spaced at least 50 feet apart, with no more than 10 pits prepared for a series of shots at any one time.

6.0 SPECIAL REQUIREMENTS FOR DEMOLITION ACTIVITIES

The following safety and operational requirements shall be followed during demolition range operations. Any deviations from this procedure shall be allowed only after receipt of written approval from the PIKA PM and the client. 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.

6.1 GENERAL REQUIREMENTS

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

- All demolition operations will comply with Attachment 1 of this ESH, Explosive Hazards Tables.
- Material awaiting destruction shall be stored at not less than intra-line distance, based on the largest quantity involved, from adjacent explosive materials and from explosives being destroyed. The material shall be protected against accidental ignition or explosion from fragments, grass fires, burning embers or detonating impulses originating in materials being destroyed.
- MEC items or bulk explosives to be destroyed by detonation shall, whenever feasible or required by the project WP, 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 quantity to be destroyed below ground at one time shall not exceed the range limit.
- Detonations will be counted to ensure detonation of all pits. After each series of detonations, a search shall be made of the surrounding area for unexploded MEC and MEC. Items such as lumps of explosives or unfuzed ammunition may be picked up and prepared for the next shot. Fuzed ammunition or items, which may have internally damaged components, will be detonated in place, if possible.
- Prevailing weather condition information will be obtained from the U.S. Weather Service and the data logged in the Demolition Shot Log (ESH-205) before each shot or round of shots.
- All shots shall be dual primed.
- A minimum of 30 seconds will be maintained between each detonation.
- After each detonation and at the end of each day's operations, surface exposed scrap metal, casings, fragments, and related items shall be recovered from the demolition range and disposed of IAW contractual procedures, as well as all applicable environmental regulations. All collected scrap metal will be 100% inspected for absence of explosive materials by demolition range personnel and certified by the SUXOS and the QCS.
- When operated in accordance with the conditions of this procedure the demolition range 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 SUXOS, who in turn, will report it to the client.

- Whenever possible, during excavation of the 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. Depending upon contract requirements, the site may have to be leveled, seeded and mulched 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 PIKA Demolition Shot Record (ESHF-205) is to be filled out by the DS with all applicable information. This record will be kept with the Explosives Accountability Record/Magazine Data Card (ESHF-203) and reflect the data for each shot.

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 communication equipment. Safety precautions will be taken to reduce the possibility of a premature detonation of the electric detonator and explosive charges of which they form a part. Radios will not be operated while the pit is primed or during the priming process.
- The shunt shall not be removed from the leg wires of the detonator until the continuity check of the detonator.
- When uncoiling or straightening the detonator leg wires, keep the explosive end 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, 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 and down wind from any MEC or demolition materials and out of the demolition range, personnel and vehicle traffic flow pattern. In addition, all personnel on the demolition range 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 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 using two-way radios if the demolition pit is not visible from the firing point. If radios are used, communication shall be accomplished a minimum of 50 feet from the demolition pit and detonators. The firing line will be checked for electrical continuity in both the open and closed positions, and will be closed/shunted prior to connecting the detonator leg wires.
- MEC to be detonated/vented shall be placed in the demolition pit and the demolition material placed/attached in such a manner as to ensure the total detonation/venting of the MEC. 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 any detonators that are connected to the firing line, personnel shall ensure that they are grounded. The detonators will then be carried to the demolition pit with the end of the detonators pointed away from the individual. The detonators are then connected to the detonation cord, Non-EI, 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 ohm 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 safe 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. At a minimum, this should be an audible signal using a siren, air horn, or megaphone, which is sounded for a duration of one minute, five minutes prior to the shot and again one minute prior to the shot.

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.
- Det cord should be placed at least 50 feet away from detonators and demolition materials until ready for use. To ensure consistent safe handling, each classification of demolition material shall be separated by at least 50 feet until ready for use.
- 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 and secured in place with soil, being sure to leave a one-foot tail exposed outside the hole.
- Once the hole is filled, 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 detonators 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 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. 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 is used (i.e., matches), do not split the safety fuse until the detonator is taped into the det cord loop.

6.4 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.
- 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 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 for each shot will be the amount needed to permit a minimum burn time of five minutes.

6.5 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.
- Keep perforators stored at the demolition site at least 50 feet away from detonators and demolition materials until ready for use.
- 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 6.3.

6.6 USE OF TWO-COMPONENT EXPLOSIVES

The following procedures are required when using two-component 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 is 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 and secure the unit.
- Proceed from this point as described in paragraph 6.3.

6.7 DEMOLITION RANGE INSPECTION SCHEDULE

The demolition range inspection schedule outlined in Table 207-1 will be followed at all sites where demolition operations are being conducted. This inspection shall be conducted by the SSHO 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 207-1: DEMOLITION RANGE INSPECTION SCHEDULE

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

Hospital Route

Prior to Use

7.0 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 of visibility of 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.

8.0 PRE-DEMOLITION/DISPOSAL PROCEDURES

8.1 PRE-DEMO/DISPOSAL OPERATIONAL BRIEFING

It is the belief of PIKA 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 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-EI).
- Means of transporting and packaging MEC.
- Route to the disposal site.
- Equipment being used (i.e., galvanometer, blasting machine, firing wire, etc.).
- Misfire procedures.
- Post shot clean up of range.

8.2 PRE-DEMO/DISPOSAL SAFETY BRIEFING

The PIKA SSHO 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.
- Horse play on the range.
- Stay alert for any explosive hazards on the range.
- Location of emergency shelter (if available).
- Parking area for vehicles (vehicles must be positioned for immediate departure, with the keys in the ignition).
- Location of range 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.
- Demolition schedule.

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 the local Police, Fire personnel, USCG and FAA as required.
- Contact hospital/emergency response personnel if applicable.
- Secure all access roads to the range area.
- Visually check range for any unauthorized personnel.
- Check firing wire for continuity and shunt.
- Prepare designated pits 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-EI initiator.
- Secure detonators in a safe location.
- Place MEC in pit and place charge in desired location.

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 the 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.
- Give one-minute warning signal, using a bullhorn or siren, five minutes prior to detonation, and again at one minute prior to detonation.
- Check the firing circuit.
- 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.
- Remain in designated safe area until DS announces **"All Clear"**. This will occur after a post-shot waiting period of 5-minutes and the DS has and inspected the pit(s).

9.0 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 for low orders or kick outs.
- Conduct a magnetometer check of the pit and remove any large fragmentation.
- Back fill hole as necessary.
- Police up all equipment.
- Notify police, fire, etc. that the operation is complete.

10.0 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.

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 30-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the designated technician 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, 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.

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, a 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.

10.3 NON-EL MISFIRE

The use of a shock tube for blast initiation can present misfires that require the following actions:

- If charge fails to detonate, it could be the result of the shock tube not firing. Visually inspect the shock tube, if it is not discolored (i.e., slightly black), it has not fired.
- If it has not fired, cut a one-foot piece off the end of the tube, re-insert the tube in the firing device and attempt to fire again.
- If the device still does not fire, wait 60 minutes and proceed down range to replace the shock tube per instructions outlined below.
- If the tube is slightly black, then a "Black Tube" misfire has occurred, and the shock tube will have to be replaced. When replacing the shock tube, be sure to remove the tube with the detonator in place. Without removing the detonator from the end of the tube, repackage the defective tube and return it to the supplier for credit.

10.4 DETONATING CORD MISFIRE

PIKA 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 10.1, 10.2, or 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 conducted:

- If there is no problem with the initiating system, wait the prescribed 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 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.

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 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.
 2. The det cord was dislodged from the perforator when placing tamping materials.
 3. The perforator was defective.
 4. The perforator was moved during the placement of tamping materials.
- Check to ensure the grain size of the det cord is sufficient, with 80 grain size or greater being the recommended size.
- If the det cord connection to the perforator was the problem, ensure that the next connection is secure (use duct tape if necessary).
- 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.

11.0 RECORD KEEPING REQUIREMENT

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

- The client or PIKA (as directed) will obtain and maintain all required permits.

- The DS will ensure the accurate completion of the logs, and the SUXOS and QCS 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 (ESHF-205) to reflect the MEC destroyed, and shall complete the appropriate information on the Explosives Accountability Record/Magazine Data Card (ESHF-203) that indicates the demolition materials used to destroy the MEC.
- The quantities of MEC recovered must also be the quantities of MEC destroyed or disposed.
- PIKA will retain a permanent file of all demolition records, including permits, magazine data cards, training and inspection records, waste manifests if applicable, and operating logs.
- Copies of ATF License and any state or local permits must be on hand.

12.0 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 SSHP.

1. Hard hats are required only when working around heavy equipment or when an overhead or head impact hazards exist.
2. Steel toe/shank boots are not required during surface/subsurface location of anomalies unless a serious toe hazard exists, whereupon a fiber safety toe will be used.
3. Safety glasses will be required an eye hazard exists, for example when working around flying dirt/debris, using hand tools, etc. Safety glasses will provide protection from impact hazards, and, if necessary, ultraviolet (UV) radiation (i.e., sunlight).
4. Positive means shall be required to secure the PPE and prevent it from falling and causing an accidental detonation.

13.0 AUDIT CRITERIA

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

1. The PIKA Demolition Shot Record (ESHF-205).
2. The Daily Task and Safety Briefing Logs (ESHF-502).
3. The Safety Training Attendance Forms, for the initial and daily site hazard training (ESHF-504).
4. Daily Inspection and Weekly Audit Report Form (ESHF-506).
5. Explosives Accountability Record/Magazine Data Card (ESHF-203).

14.0 ATTACHMENTS

None.

**TABLE 207-2:
MINIMUM SAFE DISTANCE FROM TRANSMITTER ANTENNAS**

Average or Peak Transmitter Power in Watts	Minimum Distance to Transmitter in Meters / Feet
0 – 30	30 / 98.4
31 – 50	50 / 164.1
51 – 100	110 / 360
101 – 250	160 / 525
251 – 500	230 / 755
501 - 1,000	305 / 1,000
1,001 - 3,000	480 / 1,575
3,001 - 5,000	610 / 2,001
5,001 - 20,000	915 / 3,002
20,001 - 50,000	1,530 / 5,020
50,001 - 100,000	3,050 / 10,007
100,001 - 400,000	6,100 / 20,014
400,001 - 1,600,000	12,200 / 40,028
1,600,001 - 6,400,000	24,400 / 80,056

Note: When the transmission is a pulsed or pulsed continuous wave type and its pulse width is less than 10 microseconds, the power column indicates average power. For all other transmissions, including those with pulse widths greater than 10 microseconds, the power column indicates peak power.

Source: Table 6-3, DA PAM 385-64, 15 December 1999

**TABLE 207-3:
MINIMUM SAFE SEPARATION FORMULAS**

Unknown (Worst Case)	Un-shielded Munitions		Shielded Munitions	
	Frequency	Formula	Frequency	Formula
Use Table 41-1-1	Up to 2.3 KHz	$D = 0.093 \times (PG)^{0.5}$	Up to 73 KHz	$D = 0.093 \times (PG)^{0.5}$
	2.3 KHz – 450 KHz	$D = 39.7 \times F \times (PG)^{0.5}$	73 KHz – 450 KHz	$D = 126 \times F \times (PG)^{0.5}$
	450 KHz - 400 MHz	$D = 18 \times (PG)^{0.5}$	450 KHz - 400 MHz	$D = 0.6 \times (PG)^{0.5}$
	400 MHz - 75 GHz	$D = (7137/F) \times (PG)^{0.5}$	400 MHz - 2.4 GHz	$D = (226 / F) \times (PG)^{0.5}$
	>75 GHz	$D = 0.093 \times (PG)^{0.5}$	>2.4 GHz	$D = 0.093 \times (PG)^{0.5}$

Where :

D = Safe distance to the transmitter in feet (multiply feet by 0.305 to obtain meters)

P = Output power of the transmitter in watts

G = Numerical gain of transmitter antenna

F = Frequency in MHz (divide KHz by 1,000 to obtain MHz, and multiply GHz by 1,000 to obtain MHz)

To properly use this table, the following assumptions are made:

1. No-fire Current of the EED = 10 mA
2. Safety Factor = At least 10 dB below the no-fire current in EED (or 3.16 numerical)
3. EED's Leads = Tuned to match the transmitter's frequency
4. Shielding = If metallic, it provides a minimum of 30 dB or 32 times (numerical) of shielding.
Non-metal packs provide no shielding
5. At no time should personnel or munitions be exposed to more than 200 volts / meter

Source: Table 6-4, DA PAM 385-64, 15 December 1999

1.0 PURPOSE

PIKA recognizes that projects involving munitions and explosives of concern (MEC) create and present a unique set of hazards that must be controlled to ensure safe, successful project performance. Control of MEC hazards requires a coordinated team effort in which all site personnel play an integral role. During a MEC project, all site personnel are tasked with ensuring their own safety as well as the safety of their co-workers, the environment and the public. To coordinate and oversee this effort, each project with known or potential MEC hazards will be assigned an Unexploded Ordnance (UXO) Safety Officer (UXOSO) who will be responsible for MEC safety and for implementing this Environmental Safety & Health Procedure (ESHP). This ESHP will be used in conjunction with the PIKA Corporate Environmental Safety and Health Program (CESHP) Manual, and will be implemented as part of an approved Site Safety and Health Plan (SSHP) or Accident Prevention Plan (APP). The forms associated with this ESHP can be found in PIKA ESHP -200 for MEC related forms and ESHP-500 for general safety and health forms.

2.0 SCOPE

2.1 GENERAL APPLICATION

This ESHP is applicable to all PIKA projects where PIKA personnel are assigned to the role of UXOSO. This includes any sites where there is a known or potential for exposure to MEC hazards and a UXOSO is assigned to ensure the safety and health of on-site personnel. The procedures in this program will be strictly adhered to unless otherwise amended within the site-specific project plans.

2.2 SPECIALIZED APPLICATIONS

For those project sites where MEC hazards co-exist with other significant occupational safety or health hazards, the UXOSO may be teamed with an occupational Site Safety and Health Officer (SSHO). In this situation, the UXOSO will be assigned for the duration of the MEC operations and will work together with the SSHO to ensure the protection of personnel and equipment from both occupational and MEC hazards. However, depending upon the nature and scope of the occupational S&H issues versus the scope of the MEC issues, the UXOSO may also act in the role of the SSHO. Further detail related to roles and responsibilities of the UXOSO are contained in PIKA ESHP-525, Site Safety and Health Officer Responsibilities.

3.0 REFERENCES

The Occupational Safety and Health Administration (OSHA) standards listed below apply to the conduct of operations associated with this ESHP. Additionally, the responsibilities of the UXOSO as outlined in this ESHP are also designed to meet U.S. Army Corps of

Engineers (USACE), Department of Energy (DOE), and other current client requirements.

- OSHA 29 CFR 1910 General Industry Standards.
- OSHA 29 CFR 1926 Construction Standards.
- Department of Defense (DoD) 6055.9-STD, *DoD Ammunition and Explosives Safety Standards*. 5 October 2004, with approved changes 14 December 2004.
- USACE Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosives Response*, 3 April 2006.
- USACE Engineering Manual (EM) 385-1-1, *Safety and Health Requirements Manual*, 3 November 2003.
- USACE Engineering Regulation (ER) 385-1-95, *Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations*, 30 March 2007.
- USACE EP 385-1-95a, *Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations*, 27 August 2004.
- USACE EP-75-1-2 *Munitions and Explosives of Concern (MEC) Support during Hazardous, Toxic, or Radiological Waste (HTRW) and Construction Activities*, 1 August 2004.
- USACE, EM 385-1-4009, *Military Munitions Response Actions*, 15 June 2007.
- American conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®), 2007.
- NIOSH/OSHA/USCG/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985. (DHHS (NIOSH) Publication No. 85-115).
- Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 16, *Methodologies for Calculating Primary Fragment Characteristics*, 1 December 2003.
- USACE, ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* 1 May 2007.
- Procedures for *Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites*, U.S. Army Engineering and Support Center, Huntsville, August 1998.

4.0 RESPONSIBILITIES

4.1 CORPORATE SAFETY AND HEALTH MANAGER

The PIKA Corporate Safety and Health Manager (CSHM) is responsible for the periodic review, update and implementation of this ESHP and the CESHP to ensure their continued integrity and compliance with applicable Federal, state and local MEC regulations. To effectively implement this UXOSO ESHP, the CSHM will take an active role in providing consultation and regulatory guidance to those personnel assigned to

the role of UXOSO. On those project sites where the UXOSO is co-assigned the role of the SSHO, the CSHM responsibilities in ESHP-525 will be implemented by the CSHM. On those sites where there are both a SSHO and a UXOSO, the CSHM will:

1. Consult with the project Senior UXO Supervisor (SUXOS) to ensure that the person selected for the UXOSO position meets the requirements specified by PIKA and the client and that each UXOSO has the specific training, knowledge, and experience necessary to implement the MEC-related hazard identification and control procedures outlined in the SSHP.
2. Consult with the UXOSOs in the field to ensure that all MEC-specific safety and health issues are addressed and resolved.
3. Provide technical assistance as needed regarding the implementation of the MEC-related regulations.
4. When needed, assist the UXOSO in providing mobilization and safety training.
5. Conduct periodic inspections (every 30 to 45 days) of project sites to ensure their continued compliance with applicable MEC regulations.

For those projects where there is a significant S&H hazard from MEC items, the CSHM will work closely with senior PIKA UXO-qualified personnel to ensure the continued compliance of operations with not only the project plans, but also with accepted, published MEC location, identification, transportation and demolition procedures presented in the PIKA 200-series ESHPs, and MEC-related DoD regulations.

4.2 PROJECT MANAGER

The Project Manager shall be responsible for ensuring the availability of the project personnel and equipment resources needed to implement this ESHP. The Project Manager shall also ensure that this ESHP is incorporated into site specific plans, procedures and training for those sites with MEC contamination issues.

4.3 SITE SUPERVISOR

For those sites with significant MEC hazards, the Site Supervisor (SS) will be a qualified SUXOS. The SUXOS will ensure that this ESHP is implemented by the UXOSO and will work closely with the UXOSO to ensure that all feasible controls are utilized to reduce the risk of personnel exposure to MEC hazards. During MEC location, identification, removal, transportation or demolition, the SUXOS will ensure that the UXOSO is addressing all the MEC safety and health concerns outlined in the PIKA 200-series ESHPs. While on-site, the SUXOS will have the responsibility for administratively managing the UXOSO, however, the UXOSO will still have a reporting responsibility to the CSHM regarding both MEC and non-MEC S&H issues.

4.4 UXO SAFETY OFFICER

The UXOSO has the overall responsibility for the safety and health of all PIKA, subcontractor, government, and visitor personnel while they are at a MEC contaminated site. In this role, the UXOSO must ensure that the requirements of the Work Plan, SSHP, and applicable DoD regulations are implemented by all site personnel for the duration of MEC activities. The UXOSO will also ensure that all personnel are properly trained, qualified, equipped, and physically protected from the site and operational hazards to the greatest extent feasible. To ensure MEC safety, the UXOSO will:

1. Initiate and authorize a "Stop Work" order for any imminent safety or health concerns;
2. Implement and enforce the requirements outlined in the SSHP and other DoD or other client-related regulations;
3. Conduct the MEC safety portion of the daily tailgate briefings;
4. Conduct and document MEC training related to site-specific MEC hazards;
5. Investigate and report in a timely manner any MEC-related injuries, illnesses, accidents, incidents, or near misses;
6. Conduct visitor orientation, daily safety inspections, and weekly safety audits;
7. Ensure that all MEC-related forms are initiated and completed properly to ensure the capture of all relevant MEC and explosives use data;
8. Immediately inform the CSHM and SUXOS when a SOW change is identified that effects the MEC tasks addressed in the SSHP;
9. Provide the CSHM with task hazard data for any new tasks added to the SOW or any tasks that significantly change during the conduct of site operations;
10. Ensure that no MEC operation is performed until all safety and health provisions required by this ESHP and the SSHP are implemented;
11. Implement the UXOSO requirements within each PIKA 200-series ESHP; and
12. Ensure field implementation of the PIKA MEC Safety Plan.

5.0 PROCEDURES

5.1 UXOSO MOBILIZATION AND SITE SET-UP PROCEDURES

The UXOSO will become completely familiar with the PIKA CESHP, the site-specific WP, which includes the SSHP with the MEC and non-MEC ESHPs relevant to the project. These documents will be used by the UXOSO as the basis for the mobilization training presented to site personnel and for ensuring the safe performance of site operations. Whenever possible, these documents will be given to the UXOSO prior to departure to the site. Additionally, when feasible, the UXOSO should be a member of the pre-mobilization team so that the UXOSO can either perform or assist in the performance of the site mobilization and set-up procedures listed below. In the event that a SSO is

co-assigned to the project, the UXOSO will assist the SSHO in the performance of the mobilization and set-up procedures outlined below.

1. Coordinate with all applicable local emergency response agencies (i.e. Police, Sheriff, Hospital, Life Flight, Ambulance Service and Fire Department).
2. Determine if FAA or Marine Band notices need to be made prior to demolition operations.
3. Survey the site for hazards and validating the accuracy of the site plans.
4. Validating, and if needed modifying, the medical evacuation routes presented in the SSHP and planning the personnel assembly points for emergency evacuations.
5. Inventorying the first aid, equipment, personal protective equipment (PPE), fire extinguishers, etc.
6. Validating, and if needed, changing the number, type, and location of toilet facilities.
7. Obtaining any local certificates required.
8. Preparing evacuation maps and confirming the contact list for hospital and ambulance services.

If the UXOSO is not a member of the pre-mobilization team, or if no pre-mobilization is allowed, the UXOSO will implement items 1 – 8 listed above during the first day of operation. If PIKA is acting a subcontractor to a project, many of the above tasks will already have been completed by the prime contractor prior to the arrival of the UXOSO on site. However, this does not relieve the UXOSO of the responsibility of ensuring that all of the steps listed above have been accomplished. It is imperative that the UXOSO do everything possible to ensure safe, uninterrupted site operation and that a good rapport is established with all applicable local authorities.

5.2 TRAINING REQUIREMENTS AND PROCEDURES

5.2.1 General training requirements

All site training required for the performance of MEC operations shall be conducted, or arranged for, by the UXOSO. For the hazard training required by the SSHP, the UXOSO will ensure that the data specified in the following paragraphs are presented to all affected workers. Unless otherwise specified in the SSHP, all training will be documented using the PIKA Safety Training Attendance Log (ESHP-503). At no time will PIKA personnel be permitted to conduct any site operations involving the potential for exposure to safety or health hazards until they have received appropriate training.

5.2.2 Site-specific and Hazard Information Training

Prior to the initiation of site activities involving the potential for exposure to MEC hazards, the UXOSO, in conjunction with the SS will provide Site-specific and Hazard

Information Training. The outline in Table 208-1 will be used as general guidance for the MEC training. For other non-MEC training required by the SSHP or other project plans, the training outline in ESHP-525 will be used by either the UXOSO or SSHO to conduct the site-specific and hazard information training.

5.2.3 Equipment Training

Equipment operation training will also be conducted for site personnel who will be responsible for the operation of MEC location and detection equipment, earth moving equipment (EMM), power tools or hand tools. Training requirements related to equipment use will be specified in the SSHP and ESHP-525.

5.2.4 Personal Protective Equipment Training

As specified by 29 CFR 1910.132, all site personnel required to use PPE shall be given training in the use, care, and limitations of the PPE they are to use. Prior to using the designated PPE on site, all affected personnel shall demonstrate an understanding of the training and their ability to properly use the assigned PPE. PPE training shall be documented using the PIKA Personal Protective Equipment Training Form (ESHP-530), and will address the following topics:

1. PPE selection decisions;
2. When PPE is needed;
3. What PPE is needed;
4. How to properly don, doff, adjust, and wear PPE;
5. The limitations of specific pieces/types of PPE; and
6. The proper care, maintenance, useful life, and disposal of PPE.

TABLE 208-1: SITE-SPECIFIC TRAINING TOPICS

TOPIC	SUB-TOPICS TO BE COVERED
Welcome and Introduction	
Work Plan	A. Safety And Health Chain-Of-Command B. Implications Of The Proposed Work/Project Schedule C. General Description of MEC Operations to be Conducted D. Methods For On- And Off-Site Communications E. Logs & Records
History of Facility	Brief Overview of Facility History
SSHP	(see ESHP-525 for additional SSHP topics)
Methods and Procedures	A. Safety Precautions for Suspected Fuzes and MEC Items On Site B. Vegetation grubbing (if applicable) C. MEC Detection Identifications and Markings <ol style="list-style-type: none"> 1. General 2. Sweep Lanes 3. Surface/Subsurface Anomaly Detection Techniques D. Surface Investigation and Clearance of UXO/MEC E. UXO/MEC Marking Procedures F. Subsurface Investigation and Clearance of UXO/MEC G. UXO/MEC Disposal and Collection Site

	<p>H. Safety and Health Issues of UXO/MEC Disposal</p> <ol style="list-style-type: none"> 1. UXO/MEC Disposal and Collection Site 2. UXO Disposal Procedures (Range Operations) 3. Inert MEC Disposal Procedures <p>I. Safe Equipment Use</p> <ol style="list-style-type: none"> 1. UXO Detection 2. Mechanical/Hand Tools 3. Heavy 4. Vehicles
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5.2.5 Visitor Training

Site visitors are defined as persons (1) who are not employed at the project site, (2) who do not routinely enter restricted work areas and, (3) whose presence is of short duration (i.e., 1 to 2 days per visit). Site visitors may include client personnel, PIKA personnel, commercial vendors, political representatives, and auditors or inspectors from Federal, state or local regulatory agencies. It is the responsibility of all site personnel to watch for visitors approaching the site and to immediately notify the UXOSO or SUXOS of the visitor's arrival. Visitors will be required to comply with the general requirements listed within the project SSHP. For MEC sites, the USACE Military Munitions Response Program Center of Expertise has published an Interim Guidance Document (IGD) 04-01 entitled Essential Personnel and Personal Exposure Limits for Conventional Munitions and Explosives of Concern Exclusion Zones, dated 21 April 2004. The personal exposure limits and definitions of essential personnel presented in this document will be used when assessing visitors that request entry into the exclusion zone while MEC operations are taking place.

5.2.6 Three-Day On-Site Training

During the three-day on-site supervised training required by 29 CFR 1910.120 and the PIKA CESHP the UXOSO will be responsible for ensuring that all UXO personnel are adequately trained in the safe application of the MEC location, identification, removal, transportation and demolition procedures. Once site personnel have been given this instruction and been supervised on-site for three days, the UXOSO will ensure that all personnel sign the PIKA Three-day Supervised On-site Training Form (see ESHF-511).

5.3 DAILY AND WEEKLY SAFETY BRIEFINGS

5.3.1 Daily Safety Briefing

It is essential that the UXOSO be involved in the Daily Task and Safety Brief given each day prior to commencing work. This briefing must be pertinent and informative regarding MEC operations and safety. The Daily Task and Safety Briefing will be documented using the PIKA Safety Training Attendance Form (see ESHF-503). The MEC-related items to be covered include, but are not limited to:

- The type of MEC anticipated.
- The fuzing and fillers anticipated and the safety precautions that will be used.

- Blow-in-place procedures.
- Consolidated demolition shots.
- On-site hazards that may be encountered (see ESHP-525 for additional occupational S&H topics to be covered).
- Emergency procedures, evacuation routes, and assembly points.
- MEC detection methods and hazards.

5.3.2 Weekly Safety Briefing

At the beginning of each work week, which is normally Monday, a 10-15 minute Weekly Safety Briefing (WSB) will be presented to highlight and discuss a site-specific safety or health topic. All site personnel will be required to attend the training and the UXOSO will document this training in the PIKA Safety Training Attendance Log (ESHP-503). The training will be presented by the UXOSO, or a designated representative, and will be used to cover MEC-related or S&H topics relevant to on-site MEC or other hazards.

6.0 LOGS, FORMS, REPORTS AND RECORDS

An essential element of any project is the continued maintenance of logs, reports and records which are used to document the on-site safety and health process and to log any significant events which may occur on site. In the event that there is an occupational SSHO at the site with the UXOSO, the SSHO will be the primary position responsible for S&H document management. However, the UXOSO will still maintain a UXOSO site log and will coordinate with the SSHO regarding the completion and maintenance of forms related to MEC operations. Described below are the UXOSO responsibilities regarding MEC documentation. Additional information regarding documentation and logs for non-MEC issues is presented in ESHP-525. If no SSHO is co-assigned to the site, the UXOSO will be responsible for all logs as outlined in ESHP-525.

6.1 DAILY SAFETY LOG

A daily Safety Log will be maintained on site by the UXOSO. This log will be recorded in a bound book with numbered pages, and will as a minimum the include: weather conditions, inspections conducted, results of the inspections, safety issues addressed each day, and any significant occurrences related to site safety.

The UXOSO must understand that the Daily Safety Log is a integral part of ensuring and maintaining the safety and health of on-site personnel. The data contained in the log should be of sufficient detail so as to fully document any incidents that could impact the manner in which operations are conducted or have any type of impact on safety and health policies/procedures used on site. Of special importance is the use of the log to document any MEC-related guidance or directives given to either the UXOSO or the SS by an on-site contractor representative. The log can also be used to record

statements/suggestions made by site personnel. When logging events within the log it is also of importance to log not only the initial elements of the event, but also the final disposition and outcome of the event. The UXOSO should periodically review the log to ensure there is closure for each significant event logged.

6.2 TRAINING LOG

The UXOSO is responsible for ensuring that MEC training conducted on site is recorded daily, and that the PIKA Safety Training Attendance Log (ESHF-503) is properly completed. Depending upon the number of personnel on site, the UXOSO may record the site training in the bound site Safety Log, without the generation of a dedicated, bound Training Log book. Regardless of where the training is recorded in the permanent record, the Safety Training Attendance Log (ESHF-503) will be completed and maintained on site with the other site records.

6.3 VISITOR LOG

A visitor record will be kept at the entrance to all PIKA work sites to record when off-site personnel visit the work site. Visitors to the site must be given a MEC safety briefing and must be logged in and out by the UXOSO as soon as they enter the Support Zone. Additionally, the procedures in IGD 04-01 will be followed and documented. Again, depending upon site size and conditions, the PIKA Site Visitors Entry and Exit Log (ESHF-526) may be used to initially record the entry and exit of site visitors. However, details of the visit, to include the purpose of the visit, and the personnel involved, should be recorded in the bound UXOSO Safety Log.

7.0 DAILY SAFETY INSPECTIONS AND WEEKLY SITE AUDITS

The UXOSO will conduct daily inspections and weekly audits. The UXOSO will use the PIKA Daily Inspection and Weekly Audit Report Form (see ESHF-506) and will ensure that the results are expressed to the SS. The UXOSO will be responsible for inspecting the site daily and auditing the site weekly to ensure compliance with relevant MEC procedures. A copy of the inspection checklist will be forwarded to the CSHM for review at the end of each work week and daily checklist with deficiencies noted will also be forwarded to the CSHM. Once a deficiency has been corrected, the UXOSO will notify the CSHM of the resolution. It is imperative that for each deficiency noted, there is documentation (both on the inspection/audit form and in the Daily Safety Log) of the remedial actions taken to correct the deficiency.

7.1 VEHICLE INSPECTION LOG

The UXOSO will ensure that the PIKA Vehicle Inspection Checklist and Report Form (ESHF-507) is completed for each vehicle prior to its use as an explosive transport vehicle. The UXOSO will ensure that each vehicle used for the transport of MEC is

inspected and found to be in safe condition and that all safety equipment is in place before allowing a vehicle to be used for MEC/explosives transportation.

7.2 ACCIDENT/ILLNESS/NEAR MISS REPORT

In the event of a MEC-related emergency, illness, injury, or property accident, the UXOSO will be responsible for ensuring all appropriate forms are completed and submitted in a timely fashion. The PIKA Accident/Injury/Illness/Near Miss Report (ESHF-514) will be used and completed by the UXOSO for submission to the SUXOS, PM and CSHM. Additional information regarding the use of this form is presented in ESHP-525.

7.3 EXCLUSION ZONE ENTRY/EXIT LOG

The UXOSO will be responsible for ensuring that the PIKA Exclusion Zone Entry/Exit Log is maintained. This log is required at all MEC sites where an exclusion zone (EZ) is established to control personnel exposures MEC hazards. If this log is required, the UXOSO, or a designated appointee, will ensure that all personnel working in the EZ are logged in and out. This will be required to provide accountability for EZ personnel in the event of an emergency.

8.0 SAFETY AND PPE REQUIREMENTS

The UXOSO will follow the safety and PPE requirements applicable for each area of the site where such measures are required to safeguard site personnel. The Task Hazard Assessment forms in the SSHP will be used by the UXOSO to ensure the use of proper PPE prior to entering a work area for the first time.

9.0 AUDIT CRITERIA

The following items related to site compliance with this ESHP will be maintained in site records and subject to audit:

- The Safety Training Attendance Logs (ESHF-503);
- The Documentation of Hazard Communication Training Form (ESHF-505);
- The Daily Task and Safety Briefing Log (ESHF-502); and
- The Daily Inspection and Weekly Audit Report Form (ESHF-506).

10.0 ATTACHMENTS

None.

ATTACHMENT 2

Contractor Forms

1.0 PURPOSE

The purpose of this Environmental Safety & Health Procedure (ESHP) is to provide PIKA personnel with master copies of explosives safety and health forms referenced in PIKA's Munitions and Explosives of Concern (MEC) ESHPs.

2.0 SCOPE

This ESHP applies to all PIKA projects where PIKA personnel are engaged in MEC-related activities that require the use of a specific form as outlined in the relevant ESHPs. The forms in this ESHP are to be the only versions of the forms to be used. Revisions to the forms and the subsequent distribution of the revised edition will be made using PIKA's Document Control Program.

3.0 REFERENCES

No Federal, state or local regulations apply to this ESHP. However, the following PIKA policies and procedures are applicable to the implementation of this ESHP.

- The PIKA Corporate Environmental Safety and Health Program (CESHP).
- The PIKA ESHP-208, Unexploded Ordnance (UXO) Site Officer (UXOSO) ESHP.

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER

The Project Manager (PM) is responsible for both quality and safety on all projects to which they are assigned. As such, the PM will be responsible for ensuring that UXO personnel utilizing these forms do so in a manner that effectively and efficiently captures all required project data. Additionally, the PM will also make sure that the Site Supervisor (SS) is provided ample administrative supplies to allow for the effective storage, maintenance and archiving of all project-related MEC forms.

4.2 SITE SUPERVISOR

The SS will ensure that this ESHP is implemented and that the appropriate forms are used and completed by site supervisory personnel when required by the CESHP or the MEC ESHPs that apply to work conducted on the site. Where called upon by a form, the SS will review the form contents for completeness and accuracy and sign in the appropriate space provided.

4.3 SITE SAFETY AND HEALTH OFFICER

The UXOSO (also referred to the Site Safety and Health Officer) will be responsible for ensuring that all MEC-related forms relevant to the project are properly used, completed, stored, and maintained for the duration of the project. The UXOSO will assist the SS as needed in the preparation of the MEC forms at the completion of the project to ensure effective archiving of the data. Prior to the conduct of project tasks,

the SSHO will review all relevant ESHPs and will ensure that all forms referenced in the ESHPs are completed in a timely and effective manner.

5.0 PROCEDURES

No procedures are required of this ESHP.

6.0 AUDIT CRITERIA

All forms attached to this document may be considered auditable items if they are required by a PIKA ESHP that applies to on-site operations.

7.0 ATTACHMENTS

The following forms are attached to this ESHP.

ESHF-201 Shipping & Emergency Response Information for Hazardous Materials
ESHF-202 Authorization List for Explosives Purchase, Receipt, & Transportation
ESHF-203 Explosives Accountability Record/Magazine Data Card
ESHF-204 MPPEH and RRD Inspection, Certification, and Chain of Custody Form
ESHF-205 Demolition Shot Record
ESHF-206 Flashing Furnace Pre-Operational Checklist
ESHF-207 Flashing Furnace Post Start-Up Checklist
ESHF-208 Flashing Furnace Maintenance Requirement Checklist

**ESHF-201: SHIPPING & 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 Shipping Representative:			Signature(s) of Vehicle Operator(s):		
24-Hour Emergency Assistance Telephone Numbers:			Work Hours Emergency Phone Numbers:		

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 50 FOR EXPLOSIVES (1.4)

☐

USE GUIDE 46 FOR EXPLOSIVES 1.1, 1.2, 1.3, 1.5, AND 1.6

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 (2 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 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 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 contact spilled material.

FIRST AID

Call emergency medical care.
Provide 1st aid 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.

**ESHF-202: AUTHORIZATION LIST FOR
EXPLOSIVES PURCHASE, RECEIPT, & TRANSPORTATION**

Address and County: (Home Office)

Address and County: (Field Office)

Federal License #:

Expiration Date:

**The following persons are agents, employees, or representatives of the undersigned, and are
authorized to order or acquire explosive materials on behalf of PIKA International, Inc.**

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 PIKA International, Inc

Corporate Officer: _____

Date: _____

[illegible]

ESHF-204: MPPEH AND RRD INSPECTION, CERTIFICATION, AND CHAIN OF CUSTODY FORM

Project Location:		Contract No:		DO No:	Page ___ of ___
Line	Description	Source (e.g., Grid or Range Identifier)	Container/Serial Number	Container Type	Unit Wt./Vol.
1					
2					
3					
4					
5					
6					
7					
8					
Inspector's certification: This certifies that the AEDA residue, Range Residue and/or Explosive Contaminated Property listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards.					
Printed/typed name:		Signature:		Date:	
Verifier certification: This certifies that the AEDA residue, Range Residue and/or Explosive Contaminated Property listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards.					
Printed/typed name:		Signature:		Date:	
Transporter(s)	Transporter 1 acknowledgment of receipt of materials properly sealed/secured.				
	Printed/typed name:		Signature:		Date:
	Transporter 2 acknowledgment of receipt of materials properly sealed/secured.				
	Printed/typed name:		Signature:		Date:
Final Disposition	Facility owner or operator: Certification of receipt of AEDA/Range Residue materials, except as noted above. Acknowledgment of receipt of materials properly sealed/secured.				
	Printed/typed name:		Signature:		Date:

ESHF 205: DEMOLITION SHOT RECORD

Site Name/Location:			Date:		
Shot Location (OB/OD Range or Grid No.):		Demolition Supervisor:		State License # (if applicable):	
Type of MEC Destroyed, Vented or Burned:			Firing Method:		Time of Shot:
Direction and Distance to Nearest Building, Road, Utility Line, etc.:			Temp: _____ Wind Dir./Speed: _____		
			Ceiling: _____ Clouds/% Sun: _____		
Type and Amount of Tamping or Sandbag Mitigation Used:				Mat or Other Protection Used (list):	
Seismographic / Sound Level Meter Used: Yes <input type="checkbox"/> No <input type="checkbox"/>			Readings / Results:		
Demolition Materials Used					
Description		Amount		Description	
Perforator				Time Fuze	
Det Cord				Squibs	
Detonator <input type="checkbox"/> Electric <input type="checkbox"/> Non-electric				Booster Block	
Non-EI Detonator				Other (list)	
Certification					
I certify that the explosives listed were used for their intended purpose, and that the MEC listed were rendered inert/destroyed.					
Signature of Demolition Supervisor: _____				Date: _____	

Site Name/Location:			Date:		
Shot Location (OB/OD Range or Grid No.):		Demolition Supervisor:		State License # (if applicable):	
Type of MEC Destroyed, Vented or Burned:			Firing Method:		Time of Shot:
Direction and Distance to Nearest Building, Road, Utility Line, etc.:			Temp: _____ Wind Dir./Speed: _____		
			Ceiling: _____ Clouds/% Sun: _____		
Type and Amount of Tamping or Sandbag Mitigation Used:				Mat or Other Protection Used (list):	
Seismographic / Sound Level Meter Used: Yes <input type="checkbox"/> No <input type="checkbox"/>			Readings / Results:		
Demolition Materials Used					
Description		Amount		Description	
Perforator				Time Fuze	
Det Cord				Squibs	
Detonator <input type="checkbox"/> Electric <input type="checkbox"/> Non-electric				Booster Block	
Non-EI Detonator				Other (list)	
Certification					
I certify that the explosives listed were used for their intended purpose, and that the MEC listed were rendered inert/destroyed.					
Signature of Demolition Supervisor: _____				Date: _____	

ATTACHMENT 3

Ohio EPA MEC Notification Procedures

Munitions and Explosives of Concern (MEC) at the Ravenna Army Ammunition Plant (RVAAP) - Notification Procedures

Paragraph 9(a) of the Director's Final Findings and Orders (journalized June 10, 2004) allows for the following exemption: "The requirement to obtain a hazardous waste facility installation and operation permit, as required by ORC 3734.02 (E), for the storage and treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) at OD#2, and for the in-place treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) discovered at the RVAAP that can not be safely transported to OD#2, provided, however, that Respondent shall comply with all applicable requirements of ORC chapter 3734 and OAC chapters 3745-50 through 3745-68, including but not limited to the hazardous waste requirements set forth at Appendix E."

In the absence of obtaining emergency permits, the following is the type of information that should be provided to Ohio EPA Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) [attn: Eileen Mohr] and Division of Hazardous Waste Management (DHW) [attn: Greg Orr]. The information is divided into categories: prior to destruction of the MEC and subsequent to the destruction of the MEC. Prior to the MEC destruction, notification can be made via either letter or email. Subsequent to detonation, the information can be transmitted in a written summary report after each detonation event or at the conclusion of clearance activities at a particular Area of Concern (AOC).]

Information to be provided prior to Blow in Place (BIP) or Detonation at OD#2:

1. Point of Contact (POC)
2. POC's phone number(s) and fax number
3. Location/date/time/person discovering the MEC
4. Description of MEC to be blown: including type and quantity
5. Proposed destruction location: either at OD#2 or BIP
6. Proposed method of destruction
7. Proposed methods to mitigate/abate potential contamination
8. Preparedness and prevention
9. Notifications to be made

Information to be provided subsequent to BIP or Detonation at OD#2:

1. POC
2. POC's phone number(s) and fax number
3. Description of MEC blown: including type and quantity
4. Location/date/time/person responsible for the MEC destruction
5. Location of destruction activities - description and map with GPS locations listed and (if applicable) the depth and number of shot holes utilized at OD#2
6. Method of destruction utilized
7. List of donor charges and amounts
8. Any problems encountered
9. Inspection/disposal of residues
10. Confirmation of adherence to minimum isolation distances specified in OAC 3745-68-82
11. Whether or not any subsequent soil samples were collected and location of available analytical results