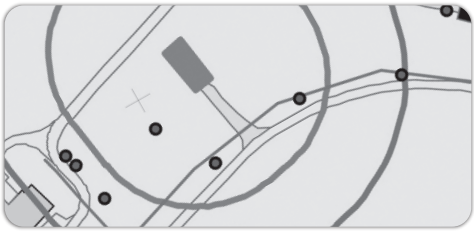
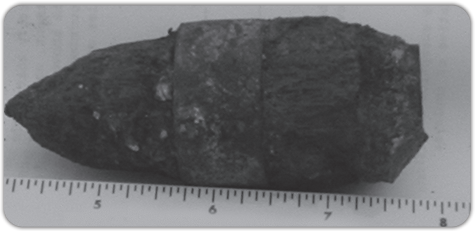
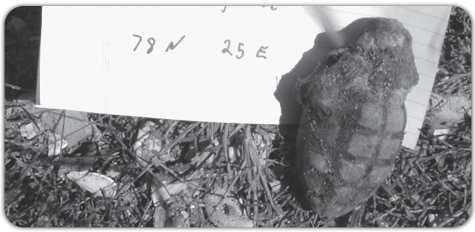
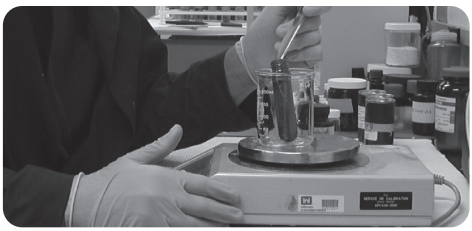
EM 385-1-97
15 September 2008

US Army Corps
of Engineers®

Explosives

Safety and Health Requirements Manual





DEPARTMENT OF THE ARMY EM 385-1-97
U.S. Army Corps of Engineers
CESO-ZA Washington, D.C. 20314-1000

Manual
No. 385-1-97 15 September 2008

EXPLOSIVES
SAFETY AND HEALTH REQUIREMENTS MANUAL

1. Purpose. This manual prescribes the safety and health requirements for all Corps of Engineers activities and operations that involve explosives related work.

2. Applicability. This manual applies to HQUSACE elements, major subordinate commands, districts, laboratories, and field operating activities (FOA).

3. References. See Appendix A.

4. General.

a. The provisions of this manual implement and supplement safety and health standards and requirements contained in the references listed in Appendix A. Where more stringent safety and occupational health standards are set forth in these requirements and regulations, the more stringent standards shall apply.

b. Mission applicability, introduced in paragraph 2 above, shall include the following:

(1) All Military Munitions Response Program (MMRP) work.

(2) All Munitions Constituents (MC) work.

(3) Construction/Deconstruction work involving the use of explosives.

(4) Design and construction of explosives facilities.

(5) Laboratory (R&D) activities.

c. Waivers. Within the Corps of Engineers, waivers to provision of this manual require the approval of the Chief of Safety and Occupational Health, HQUSACE, unless otherwise specified. A waiver is a written authority that permits temporary deviation from standards for strategic or compelling reasons. A waiver shall be substantiated with a hazard analysis of the activity, documented, and forwarded through channels to the Chief of Safety and Occupational Health, HQUSACE.

d. Exceptions. Some of the technical requirements of this manual may not always be applicable to overseas activities due to conflicting circumstances, practices, and laws or regulations of the locality or the unavailability of equipment. In such instances, means other than the ones specified in this manual may be used to achieve the required protection. When this occurs, a hazard analysis must be made to document that the required protection will be achieved by the alternate means.

e. Unless otherwise indicated, when publications are referenced in this manual, the most recent edition is to be used.

FOR THE COMMANDER:

STEPHEN L. HILL
COL, EN
Chief of Staff

TABLE OF CONTENTS

Section **Page No.**

Section (Continued) **Page No**

Section (Continued) **Page No**

Section (Continued) **Page No**

Appendix No. **Page**

Figure No. **Page**

Table No. **Page**

CHAPTER I

MUNITIONS AND EXPLOSIVES OF CONCERNS (MEC) ACTIVITIES

SECTION 1

PROJECT MANAGEMENT

I.1.A GENERAL

I.1.A.01 MEC Activities. This section applies to MEC activities, such as anomaly avoidance, investigations, removal, remedial actions, and MEC Support to Hazardous, Toxic, and Radioactive Waste (HTRW), and Construction work.

I.1.A.01.01 Safety and Occupational Health Plans. MEC site operations require development and implementation of an Accident Prevention Plan (APP) supplemented with a Site Safety and Health Plan (SSHP) appendix to address MEC-related hazards. The APP shall cover each element in EM 385-1-1, Appendix A and the SSHP appendix elements below. The APP shall reflect and correspond with the overall safety and health program. Some elements in EM 385-1-1, Appendix A are duplicated in the SSHP appendix elements below. Address duplicate elements in the SSHP appendix. Do not repeat information. The SSHP appendix shall cover each of the following elements for the MEC project in specific detail:

a. Site description and contamination characterization;

b. Hazard/Risk Analysis (Activity Hazard Analysis (AHA) for each task/operation to be performed on-site);

c. Staff organization, qualifications, and responsibilities;

d. Training;

e. Personal Protective Equipment (PPE);

f. Medical Surveillance;

g. Exposure Monitoring/Air Monitoring;

h. Heat and Cold Stress management;

i. Standard Operating Safety Procedures, Engineering Controls and Work Practices;

j. Site Control Measures;

k. Personal Hygiene and Decontamination;

l. Equipment Decontamination;

m. Emergency Equipment and First Aid;

n. Emergency Response and Contingency Procedures; and

o. Logs, Reports and Recordkeeping.

I.1.A.01.02 Staff organization, qualifications, and responsibilities. The following staff is required for implementation of safety and occupational health requirements at operations on MEC sites:

a. The contractor is responsible for having as many of the following professionals (with credentials and possessing at least three (3) years of experience) as necessary - Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), or Certified Health Professional (CHP) - to manage safety and occupational

health on cleanup operations at HTRW/MEC sites. Individual credentials must reflect an ability to control and manage site related hazards (CIH for contaminant-related chemical hazards, CSP for contaminant-related safety hazards, CHP for contaminant-related ionizing radiation hazards). This/these individual(s) is/are responsible for the following actions:

(1) Develop and maintain the APP;

(2) Develop and oversee implementation of Project-specific SSHP appendix;

(3) Visit the project as needed to audit the effectiveness of the APP;

(4) Remain available for project emergencies;

(5) Develop modifications to the APP as needed;

(6) Evaluate occupational exposure monitoring data and adjust APP requirements as necessary;

(7) Serve as a quality control staff member; and

(8) Approve the APP by signature.

b. An Unexploded Ordnance (UXO) Safety Officer (UXOSO), meeting the personnel qualification requirements of the Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP) 18, shall be used on all MEC project sites. The UXOSO shall have the authority and is responsible for the following actions: ***> See paragraph C2.1.6 of DDESB TP 18 for a more extensive listing of UXOSO functions.***

(1) Be present during MEC operations to implement the APP;

(2) Inspect site activities to identify safety and occupational health deficiencies and correct them;

(3) Coordinate changes/modifications to the APP with the appropriate site personnel and contracting officer;

(4) Conduct Project-specific training; and

(5) Has stop-work authority for all safety issues.

I.1.A.01.03 MEC site safety and occupational health training. Personnel must comply with the general and Project-specific training requirement identified in Section 1.J, the manual for Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

I.1.A.01.04 Medical Surveillance. All personnel performing on-site work that will cause exposure to contaminant-related health and safety hazards shall be enrolled in a medical surveillance program that complies with Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.120 (f)/29 CFR 1926.62 (f). United States Army Corps of Engineers (USACE) employees must comply with their local district medical surveillance policies. The medical surveillance program must meet the following requirements:

a. Examinations must be given at least once every twelve months unless the attending physician believes a longer interval (not greater than biennially) is appropriate.

b. Examinations must be administered by a licensed physician who is certified by the American Board of Preventive Medicine or a licensed physician who is eligible to be certified by the board.

c. Medical examinations shall meet the requirements specified by the licensed physician. The licensed physician shall account for site-specific issues in the examinations.

d. The physician’s opinion concerning the employees’ abilities to perform the assigned work shall be provided to the Safety and Health Manager (SHM).

I.1.A.01.05 PPE. PPE used to protect workers from contaminant-related hazards must comply with the requirements specified in the SSHP appendix.

I.1.A.01.06 Exposure Monitoring/Air Sampling Program. Exposure monitoring and air sampling must be performed to evaluate the adequacy of prescribed PPE and to evaluate worker exposure to site-related contaminants. Project-specific exposure monitoring/air sampling requirements must comply with requirements specified in the SSHP appendix.

I.1.A.01.07 Site Control Measures. The contractor shall describe site control measures, which will include site maps, the work zone (WZ) and exclusion zone (EZ) delineations and access points, the on/off site communication system, general site access controls, and security procedures (physical and procedural).

I.1.A.01.08 Personal Hygiene and Decontamination. There shall be a personal hygiene and decontamination station set up in the Contamination Reduction Zone (CRZ) for personnel to remove contaminated PPE and to wash when exiting the WZ/EZ. Project-specific decontamination procedures shall comply with the requirements specified in the SSHP appendix.

I.1.A.01.09 Equipment Decontamination. There shall be an equipment decontamination station set up in the CRZ for equipment to be decontaminated when exiting the WZ/EZ. Project-specific equipment decontamination procedures shall comply with the requirements specified in the SSHP appendix.

I.1.A.01.10 Emergency Equipment and First Aid and Cardio Pulmonary Resuscitation (CPR) Requirements. The equipment and personnel required for first aid and CPR shall comply with the requirements in Section 3 of EM 385-1-1. Emergency equipment required to be on-site shall have the capacity to respond to project-specific emergencies.

I.1.A.01.11 Emergency Response and Contingency Procedures. Project-specific emergency response procedures shall be

addressed in the SSHP appendix. At a minimum, the following emergency response and contingency procedures shall be evaluated:

a. Pre-emergency planning. There shall be an agreement between the contractor (or the government for in-house work) specifying the responsibilities of on-site personnel and the local emergency responders in the event of an on-site emergency.

b. Personnel and lines of authority for emergency situations.

c. Project-specific emergency response recognition.

d. Criteria and procedures for site evacuation. Evaluate the following:

(1) The emergency alarms system for the site;

(2) Evacuation routes;

(3) Emergency reporting locations; and

(4) Site security for emergency situations.

e. Decontamination and medical treatment of injured personnel.

f. A route map to emergency medical facilities and phone numbers for emergency responders.

g. Criteria for alerting the local community responders.

I.1.A.01.12 An abbreviated SSHP (ASSHP) is required for MM Response Project (MMRP) site visits per ER 385-1-92 when intrusion is not permitted - the site visit is executed using anomaly avoidance techniques. Safety is a primary consideration when conducting a site visit at a property that is potentially contaminated with MEC. The district is responsible for executing and approving the ASSHP. ***> See Appendix L.***

a. If ordnance is found during the site visit, extreme caution must be exercised. Personnel conducting the visit should not touch, move, or jar an apparent MEC item in any way, regardless of its apparent condition. Follow the requirements of Chapter III.

b. Visible Evidence of MEC Contamination. The most obvious evidence of MEC contamination is visible evidence at the surface. Due to the time difference between the actual contamination of the site and current assessment visits, however, MEC items may not be apparent due to the effects of erosion on land markings and oxidation of metal parts or fragments. The following paragraphs describe visual evidence of MEC that may be encountered on the site visit.

(1) True Craters. These are formed when an ordnance item penetrates the ground and explodes. The size varies with the depth of penetration, size of the ordnance, and the geology of the site. They can be identified by striation marks leading out from the crater, the slanted sides, and a raised lip around the crater edge.

(2) False Craters. These are formed by large unexploded projectiles and are actually just a point of entry. A false crater has vertical sides, flat bottom, and non-raised lips. False craters can be as large as 10 feet in diameter.

(3) Ordnance Items or Fragments. It may be possible to find intact MEC items at the surface. In many cases, however, only fragments or parts will be found. In training ranges, the detonation or impact may shatter the item into many unrecognizable pieces. Open Burn/Open Detonation (OB/OD) operations will create the same effect.

(4) Soil Stains. An unnatural soil color may indicate bulk explosive contamination. The particular color of soil stain is not a very good indicator of the type of explosive due to weathering effects and the vast number of possible explosive mixtures. Only chemical analysis can provide reliable explosive identification. The only responsibility of the personnel performing the site visit is to note these areas in the site visit report.

I.1.A.02 MEC Support for HTRW and Construction Activities.

I.1.A.02.01 Anomaly Avoidance Procedures During HTRW Activities.

a. The purpose of anomaly avoidance during HTRW activities is to avoid any potential surface MEC and subsurface anomalies during investigation activities. Intrusive anomaly investigation is not authorized during anomaly avoidance operations.

b. Team composition. The team will consist of a minimum of two personnel, one of whom must be a qualified UXO Technician II or above. This individual will be the team leader. The team must be on site during all investigative activities.

c. The team will have the following responsibilities:

(1) Prepare a MEC supplement to the approved WP and SSHP for the site.

(2) Provide MEC/anomaly avoidance tasks, such as MEC recognition, anomaly location, and safety functions for the site during HTRW investigative activities.

(3) Conduct MEC safety briefings for all site personnel and visitors.

(4) Report any MEC items discovered to the appropriate person/organization, in accordance with (IAW) the WP, SSHP, or APP.

d. Detailed procedures are contained in Chapter 5, EP 75-1-2, UXO Support During HTRW and Construction Activities.

I.1.A.02.02 MEC Support For Construction Activities.

a. MEC support during construction activities may require stand-by support or a complete MEC subsurface removal,

depending on an assessment of the probability of encountering MEC and the level of confidence associated with the determination.

(1) If the probability of encountering MEC is low (for example, if current or previous land use leads to an initial determination that MEC may be present), only MEC standby safety support will be required.

(2) When a determination is made that the probability of encountering MEC is moderate to high (for example, if current or previous land use leads to a determination that MEC was employed or disposed in the area of concern), UXO qualified personnel must conduct a subsurface removal of the known construction footprint and remove all discovered MEC.

(3) When a subsurface removal in the construction footprint is required, an Ordnance and Explosives (OE) safety specialist (OESS) will be on-site to provide safety and quality oversight IAW the provisions of ER 385-1-95. ***> See Appendix G.***

b. UXO Team Composition.

(1) For standby support, the UXO team will consist of a UXO Technician III and a UXO Technician II.

(2) For subsurface removal, the UXO team will have a minimum of two UXO qualified personnel.

c. Detailed procedures are contained in Chapter 6, EP 75-1-2, UXO Support During HTRW and Construction Activities.

I.1.A.02.03 Personnel qualifications for these activities are contained in DDESB TP 18.

I.1.A.03 Explosive Safety Submission (ESS) and Explosive Site Plans (ESP).

I.1.A.03.01 Purpose: The ESS ensures that all applicable Department of Defense (DoD) and Department of the Army (DA)

explosives safety standards are applied to a MEC response action. The ESS must be approved prior to intrusive removal tasks starting at a site. The ESS must have a Direct Reporting Unit (DRU) approval, an Army approval, as well as a DDESB approval. Presently, the Environmental and Munitions Center of Expertise (EM CX), MM Division at the U.S. Army Engineering and Support Center, Huntsville, Alabama (CEHNC), provides the DRU approval for HQs USACE and submits the document to USATCES for Army approval.

I.1.A.03.02 MEC Response Actions requiring an ESS.

a. Any MEC removal response subsequent to an investigative action requires an ESS. This includes, but is not limited to:

(1) No Department of Defense Action Indicated (NDAI) or No Further Action (NOFA);

(2) Time Critical Removal Action (TCRA);

(3) Construction support; and

(4) Non-Time Critical Removal Action (NTCRA).

b. Any execution of the explosives safety aspects of the selected response action.

I.1.A.03.03 Detailed procedures for completion and submission of an ESS are contained in EP 385-1-95b, Explosive Safety Submission, DoD 6055.09-STD, and Appendices P, T, U, V, W, X and Y. Department of the Army Pamphlet (DA PAM) 385-65 is a new document that will have specific procedures for the preparation and submittal of ESP, ESS, and Chemical Safety Submission (CSS).

I.1.A.03.04 ESPs are required for those MEC activities relative to conducting Site Investigations or other types of investigative actions/characterizations where intentional physical contact with MEC is anticipated and expected.

I.1.A.03.05 An ESS/ESP is not required for:

a. A munitions or explosives emergency response;

b. Preliminary assessments or site visits when intentional physical contact with MEC, or the conduct of ground-disturbing or other intrusive activities are not intended;

c. Clearance activities on operational ranges;

d. Munitions responses on former ranges used exclusively for small-arms ammunition;

e. On-call construction support; and

f. Anomaly avoidance activities.

I.1.A.03.06 Routing for ESP, ESS, CSS, and CSP for USACE projects is defined in ER 385-1-95. The Environmental and Munitions Center of Expertise, MM Division (CEHNC-EM CX) has been delegated approval authority for HQUSACE for these documents.

I.1.A.03.07 There are two categories of changes to site plans and safety submissions:

a. Amendments - these are changes that affect the explosive safety-quantity distance (ES-QD) arcs for any part of the MEC operations previously approved in the original ESS. They must be routed through the same channels as the original ESS for review and approval.

b. Corrections - these are changes that are primarily editorial in nature and do not affect the ES-QD arcs. These changes are routed up to the DRU approval authority - CEHNC-EM CX for review and approval. Upon approval, the EM CX will return approval to the requestor and forward on to USATCES for their information and USATCES will forward on to DDESB for their files.

I.1.A.04 CSS.

I.1.A.04.01 Purpose: The CSS ensures all applicable DoD and DA chemical and explosives and chemical agent safety standards are applied to a MEC response action, Recovered Chemical Warfare Materiel (RCWM) is a subset of MEC. The CSS must be approved prior to intrusive investigation/removal tasks starting at a site.

I.1.A.04.02 RCWM Response Actions requiring a CSS. Any activity (such as surface removal of RCWM or excavations when the intent is to uncover, characterize, and remove geophysical anomalies) will require a CSS.

I.1.A.04.03 Detailed procedures for completion and submission of a CSS are contained in EP 75-1-3, RCWM Response and in DoD 6055.09-STD.

I.1.A.04.04 See paragraph I.1.A.03.07 above for changes to these documents.

I.1.A.05 General MEC Safety.

I.1.A.05.01 Personnel who will be handling MEC will not wear outer or inner garments having static electricity generating characteristics. Materials made of 100-percent polyester, nylon, silk, and wool are highly static producing. Refer to DA Pam 385-64 for more information regarding non-static-producing clothing.

I.1.A.05.02 Other safety considerations are discussed in EP 385-1-95a, and ER 385-1-95 and include: MEC safety precautions; MEC storage; MEC transportation on-site and off-site; EZ operations; MEC excavation operations; and MEC disposal operations.

I.1.A.05.03 Safety considerations for RCWM for chemical safety, storage, transportation, EZ distances, No Significant Effects distances, Public Access Exclusion Distances (PAED), and excavation operations are discussed in EP 75-1-3 and described in the CSS.

I.1.B PERSONNEL STANDARDS AND QUALIFICATIONS

I.1.B.01 Contractor UXO Personnel Qualifications. The DDESB has set forth personnel standards that are applicable to contractor UXO personnel working for the DoD. The USACE will comply with the standards as contained in DDESB TP 18.

I.1.B.02 Government Personnel. Any person filling the position of OESS will be classified in the General Schedule 0018 series and be a graduate of the DoD's EOD schools. OESS functions will not be performed by contractor personnel. ***> See Chapter 15, EP 1110-1-18.***

I.1.B.02.01 The OESS will have:

a. The ability to identify fuzing, precautions that must be taken, fuze condition (such as armed, functioned, or armed and functioning), and how this condition can or will affect the munition payload if other external forces are applied.

b. The ability to recognize munition and ordnance types, determine hazards and make risk assessments. This includes identifying potential fillers, including those in extremely deteriorated condition (such as high explosives, fragmentation, white phosphorus (WP), and chemical warfare materiel).

c. The ability to determine whether munitions can be moved before being destroyed or must be blown in place, as well as the fragmentation radius or, in the case of RCWM, the potential downwind hazard, along with the engineering controls required to mitigate both.

I.1.B.03 UXO Experience. UXO personnel may receive credit for experience; years of experience will be granted for assignments to a military active duty EOD position and/or for time served as a UXO Technician I, II, III, or UXOSO, UXO Quality Control Specialist (UXOQCS), or Senior UXO Supervisor (SUXOS) while working for a munitions response contractor.

I.1.B.04 Citizenship Requirements. ***> See TP 18.***

I.1.B.04.01 To employ non-U.S. citizens, the following conditions must be met:

a. The contractor will be required to provide a certification that each non-U.S. worker to be hired has received the necessary training and possesses the requisite experience, as specified in Table 4-1, TP 18, for the position hired, and has completed HAZWOPER training.

b. The contractor's certification shall be provided to the USACE Contracting Officer for a determination of acceptance or rejection.

c. Additionally, the contractor will certify that non-U.S. workers:

(1) Meet the requirements of 18 USC 842, as amended by the Bureau of Alcohol, Tobacco and Firearms (BAFT) on 20 March 2003 in 27CFR Part 555, Section 26.

(2) Are in the United States in a legal status before they are permitted to work on a MEC response project.

(3) For existing MM contracts that specify U.S. personnel for UXO positions, this language will be changed to read "qualified UXO personnel."

(4) Possess a valid work visa and compliance with other legal requirements for working within the United States.

I.1.C UXO TEAM ORGANIZATIONAL STANDARDS

I.1.C.01 Unexploded Ordnance Team Organizational Standards. The following team organizational standards will be followed for USACE munitions response projects:

I.1.C.01.01 Site Management.

a. Each munitions response project will have a SUXOS.

b. The SUXOS will supervise no more than ten (10) UXO teams.

I.1.C.01.02 Field Safety and Quality Management.

a. UXO Safety Officers:

(1) A full-time UXOSO will be on site for each munitions response project. This position may be combined with the UXOQCS when there are fifteen (15) or fewer people on site. The UXOSO will not be involved in any MEC removal or investigation tasks. The UXOSO will report directly within the corporate safety chain, not to site operations personnel.

(2) A full-time UXOSO will be present during all field operations on a RCWM project site because of the complex hazards posed by RCWM. UXO qualifications for the safety officer are not required for sites where RCWM is in chemical agent identification sets, shipping containers, or other non-munition type containers.

b. UXO Quality Control (QC) Specialists:

(1) A UXOQCS may not be required full time on site. However, QC functions will be performed for all field activities within the EZ and those involving explosives handling and management.

(2) The UXOQCS will ensure high quality in the field without compromising safety and will not perform any removal or investigation tasks. All project Quality Control Specialists (QCSs) will report directly within the corporate quality chains, not to site operations personnel.

(3) A full-time UXOQCS will be used for all RCWM field operations. This requirement may be relaxed if a written request, citing actual site conditions, is submitted to the Contracting Officer (CO) for approval.

(4) When authorized, and the UXOSO and UXOQCS functions are combined in a single person, the individual filling this position will remain on site at all times during field operations.

I.C.01.03 UXO Team. The UXO Team shall:

a. Be supervised by a UXO Tech III;

b. Have a minimum of two (2) UXO qualified personnel, one (1) of which will be the UXO Tech III and up to six (6) additional personnel;

c. When munitions response operations are limited to surface removals, a basic UXO team will consist of one (1) UXO Technician III, one (1) UXO Technician II, and up to six (6) UXO sweep personnel (for a total of eight (8) personnel). If the area to be cleared is large, two (2) additional UXO Technician IIs and up to twelve (12) UXO sweep personnel may be added to basic team (for a total of 22 personnel).

I.1.D OTHER PROJECT TEAM STANDARDS

I.1.D.01 The following apply to all project teams, other than UXO Teams.

I.1.D.01.01 All other project teams (such as geophysical data collections, survey, brush clearing, etc.) must have a UXO Technician II or above assigned to the team when working in an area where MEC is suspected and where, at a minimum, a surface removal/remedial action has not been completed. “Completed” means appropriate quality control and quality assurance standards have been met. UXO Technicians are required to perform anomaly avoidance or other functions to reduce the probability of these project teams from encountering MEC.

I.1.D.01.02 Skills and compositions of other project teams will be appropriate to the task being performed, including quality control.

I.1.D.01.03 If the other project teams have been determined to be essential personnel to the project execution, they will maintain the minimum Team Separation Distance (TSD) (normally the K-40 distance of the Munition with Greatest Fragmentation Distance (MGFD) for the Munitions Response Site (MRS) where the work is taking place) from other teams working in the area. This includes the UXO teams.

I.1.E. ACCIDENT REPORTING AND RECORD KEEPING

I.1.E.01 All accidents will be reported IAW current USACE guidance. This guidance is contained in Army Regulation (AR) 385-40 with the USACE supplement.

I.1.E.02 Mishaps Involving Conventional MM will include Notification of the Director of Army Safety and the DDESB.

I.1.E.03 USACE elements conducting MM operations will report any mishaps meeting the following criteria telephonically to their respective Safety Offices:

a. Potential for fatality or permanent disability of DoD military, civilian, or contractor employee;

b. Injury to DoD military, civilian, or contractor employees;

c. $5,000 or more property damage;

d. Production loss of 72 hours or more; and/or

e. Probable public interest such as media coverage.

I.1.E.04 The office accepting the report will forward the report to the appropriate activities within the Army and DoD.

I.1.E.05 Ensure a follow-up report(s) for mishaps involving MM is made to Army Safety and the DDESB, as required.

I.1.E.05.01 Mishap Reporting Format. Initial reports shall be provided as soon as possible and shall include as much of the following data as may be available:

a. Name and location of reporting activity;

b. Name, title, and telephone number of person reporting and of contact at scene of the accident;

c. Location of the mishap (activity, city, installation, building number or designation, road names, or similar information);

d. Item nomenclature (Mk, Mod, FSC FIIN, DODAC, NALC or agent name);

e. Quantity involved: number of items and Net Explosive Weight (NEW);

f. Day, date, and local time of mishap;

g. Synopsis of mishap events;

h. Number and types of injuries (military, DoD civilian, or other civilian);

i. Description and cost of material damage (government or non-government);

j. Apparent cause;

k. Action planned or taken (corrective, investigative, or EOD assistance);

l. Effect on production, operation, mission, or other activity;

m. Regulator and media notification made or to be made if any; and

n. Name, telephone number, and email address for point of contact for additional information.

I.1.E.05.02 Follow-up Reports. Follow-up reports shall be submitted after initial notification and shall contain any additional or corrected information on the data elements contained in paragraph I.1.E.05.01, above.

I.1.F DETERMINATION OF GOVERNMENT SAFETY OVERSIGHT > *Refer to ER 385-1-95.*

I.1.F.01 General. There are many factors involved in determining the requirements, or the necessity, for a government safety specialist on an MM response action.

I.1.F.01.01 Some of these factors for consideration are:

a. The type of response action;

b. The project site location;

c. The District being supported;

d. The contractor doing the work; and

e. The availability of resources.

I.1.F.02 USACE-led RCWM response actions.

I.1.F.02.01 USACE-led RCWM response actions will always have a government safety specialist providing safety oversight. This is due to the complexity of the RCWM response action and the number of on-site team members that comprise the project team. Several command layers are crossed and represented on an RCWM response action, including the 20th Support Command, 22nd Chemical Battalion, U.S. Army Technical Escort Unit, Edgewood Chemical and Biological Center, USACE districts, Emergency Response personnel, and a host of other team members. In many cases the government safety specialist is the

only government representative on the ground. EP 75-1-3, RCWM Response Process, provides detailed coverage of the inner workings and responsibilities for the RCWM response action.

I.1.F.02.02 For HTRW or Construction activities/investigations on project locations with a history of Chemical Warfare Materiel (CWM), the DA has devised a process to evaluate the applicability of the interim guidance issued in 1997 when determining the overall scope of work for RCWM projects. In this process, a “Probability Assessment” is made to identify the probability only of encountering RCWM during the site activities. If the probability is determined to be remote or unlikely, the project can be done as a non-CWM project under the provisions of 29 CFR 1910.120 rather than under AR and DA Pam 385-61 and the Interim Guidance document dated 1997 for DASA-ESOH.

I.1.F.03 Other MM response actions include:

I.1.F.03.01 Removal actions.

a. TCRAs, normally surface clearances, other than operational ranges;

b. NCTCRAs.

(1) Surface Investigations; and

(2) Sub-surface Investigations.

I.1.F.03.02 Engineering Evaluation/Cost Analysis (EE/CA). An EE/CA has many of the same considerations as a TCRA or NTCRA. It typically does not require an ESS, but may require an ESP.

I.1.F.03.03 Remedial Investigation/Feasibility Study (RI/FS). An RI/FS has many of the same considerations as a TCRA or NTCRA. It may or may not require an ESS or ESP.

I.1.F.03.04 Site visits. Anomaly avoidance techniques are to be employed. No intrusive activities are to take place.

I.1.F.03.05 Geophysical Surveys. Anomaly avoidance techniques are to be employed. No intrusive activities are to take place.

I.1.F.03.06 Geological Surveys. Anomaly avoidance techniques are to be employed. No intrusive activities are to take place.

I.1.F.03.07 Construction Support. A probability assessment has been done and the site has been ranked as “low”, “moderate”, or “high” probability of encountering MEC, with commensurate UXO safety support, IAW EP 75-1-2.

I.1.F.03.08 HTRW support. A probability assessment has been done and a determination that the probability of encountering UXO was “low”, with commensurate UXO safety support, IAW EP 75-1-2.

I.1.F.03.09 Site Inspections. These typically do not involve intentional physical contact with MEC.

I.1.F.04 To determine if a government safety oversight is needed, and in order to estimate the length of time needed for this oversight on an MM response action. ***> See ER 385-1-95.***

I.1.G PPE

I.1.G.01 For MEC response actions, PPE is normally considered to be:

a. Clothing suitable for the weather and work conditions; the minimum for fieldwork shall be a short sleeve shirt, long pants (not excessively long or baggy pants), and leather or other protective work shoes or boots (meeting American National Standards Institute (ANSI) Z41 standards).

b. If the Position Hazard Analysis (PHA)/Activity Hazard Analysis (AHA) identifies activities that may result in injuries to

hands, appropriate hand protection for the hazard shall be worn IAW ANSI/International Safety Equipment Association (ISEA) 105.

c. Persons exposed to vehicular or equipment traffic, including signal persons, spotters, or inspectors, shall wear high visibility apparel meeting ANSI/ISEA 107 Class 3 requirements.

d. Workers who operate chain saws shall wear protective leg chaps. These chaps must meet the specifications in American Society for Testing and Materials (ASTM) Standard F1897.

e. Eye and face protection shall be provided when the PHA/AHA identifies this hazard. All eye and face protection equipment shall meet the requirements of ANSI/American Society of Safety Engineers (ASSE) Z87.1 and bear a permanent and legible “Z87” logo to indicate compliance with this standard.

f. Hearing Protection and Noise Control shall be provided to DoD employees whenever sound-pressure levels exceed 85 decibels A-weighed (dbA) steady state expressed as a time-weighted average (TWA) or 140 dbA impulse. Contractors' APP/SSHPs AHA will address this issue.

g. Head protection is required when the AHA/PHA identifies this as a hazard to the employee. If required, Type II headgear is recommended. All protective headgear shall meet the requirements of the current ANSI Z89.1 Standard.

h. Respiratory protection requirements shall be identified in the AHA/PHA.

I.1.G.02 PPE for all personnel involved in RCWM MEC response actions will be identified in the AHA/PHA for that project’s SSHP/APP.

I.1.G.03 PPE requirements for Emergency Operations may be slightly different than those identified above. ***> See EM 385-1-1, Appendix B.***

I.1.H WAIVERS

I.1.H.01 Generally speaking, waivers to the provisions identified within this document will be handled as described in the parent document from which the process evolved, (for example, waiver requests for explosives safety issues are normally discussed in those guidance documents – AR 385-10, DoD 6055.09-STD).

I.1.I MONITORING REQUIREMENTS FOR SAFETY AND QUALITY

I.1.I.01 Quality Assurance Surveillance Plans (QASP).

I.1.I.01.01 A QASP that directly corresponds to a contract's specified performance standards is used to measure contractor performance and to ensure that the Government receives the quality of services called for under the contract and pays only for the acceptable levels of services received. Each PDT member has an important part to play to ensure quality products are received from the contractor.

I.1.I.02 QASP Non-Conformances.

I.1.I.02.01 Non-conformances will be documented on a Corrective Action Request (CAR) form. ***> See Appendix F.*** The contractor will be provided a copy of the CAR. Generally, the contractor has the option of re-performing the work at no additional cost to the Government. However, there are circumstances where re-performance is not an option.

I.1.I.02.02 Each CAR will be annotated as a critical nonconformance, major nonconformance, or minor nonconformance. The PDT determines appropriate contractor response times on a project-by-project basis. Contractor response times provided below are for illustrative purposes only. Note that any life or mission threatening safety issues must be corrected immediately. The following definitions are derived from FAR 46.101.

a. Critical Nonconformance: a nonconformance that is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or dependent upon the supplies or services; or is likely to prevent performance of a vital agency mission. Include in the QASP that the contractor will typically be provided 24 hours (1 business day) to provide a written response to the CAR.

b. Major Nonconformance: a nonconformance, other than critical, that is likely to result in failure of the supplies or services, or to materially reduce the usability of the supplies or services for their intended purpose. Include in the QASP that the contractor will be provided not more than 5 business days to provide a written response to the CAR.

c. Minor Nonconformance: a nonconformance that is not likely to materially reduce the usability of the supplies or services for their intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the supplies or services. Include in the QASP that the contractor will be provided not more than 15 business days to provide a written response to the CAR.

I.1.I.03 Safety Monitoring of Project Activities.

I.1.I.03.01 The responsible safety office for the project will conduct quarterly safety audits of MEC projects and its activities.

I.1.I.03.02 Safety Offices will be required to conduct operational surveys of RCWM projects prior to the conduct of the Major Army Command (MACOM)/DRU pre-operational survey. Part of this survey process will include a Table-Top exercise conducted at the project location with all of the stakeholders for the project.

I.1.J TRAINING (HAZWOPER) > *Refer to ER 385-1-95.*

I.1.J.01 General.

I.1.J.01.01 The minimum requirements for training applicable to RCWM operations are stated below and shall comply with 29 CFR

1910.120, 29 CFR 1910.134, and 29 CFR 1926.65. AR 385-61, DA PAM 385-61, DA PAM 40-173, and DA PAM 40-8 also apply for RCWM/CACM activities. Further guidance can be found in EP 385-1-95a, and EP 75-1-3.

I.1.J.01.02 Workers are to be trained to competently execute the tasks required by their job functions and responsibilities. The clear intent of the training standards and/or the content of the training curriculum should be emphasized more than the duration of the training session. The training must address the safety and health hazards present at the project and the related procedures and controls necessary for worker protection.

I.1.J.01.03 All workers must read and understand the approved plans for the specific tasks in which they are involved. Supervisors will provide initial training for, and periodically review requirements with, employees.

I.1.J.02 MEC projects.

I.1.J.02.01 Workers and visitors in the EZ shall receive on-site safety and health training provided by the UXOSO. The training shall be commensurate with the degree of hazard to which they may be exposed.

I.1.J.02.02 Workers performing direct work in the EZ shall have a minimum of 40 hours of off-site instruction, and three (3) days of actual field experience under the direct supervision of a trained, experienced supervisor.

I.1.J.02.03 Managers and supervisors, directly responsible for, or who supervise employees engaged in hazardous operations, are responsible for their training and shall receive 40 hours initial training, three (3) days of supervised field experience, and eight (8) additional hours of specialized supervisor's training. At the time of job assignment, training on such topics as the WP (APP/SSHP), ESP, CSP, ESS, CSS, and areas identified below will be required.

a. The employer's safety and health program;

b. PPE program;

c. Spill containment program;

d. Health hazard monitoring procedures and techniques; and

e. Hazardous Communications Program (29 CFR 1910.1200).

I.1.J.02.04 All workers are required to complete:

a. A 40-hour HAZWOPER training course IAW 29 CFR 1910.120;

b. An eight (8) hour annual refresher course IAW 29 CFR 1910.120 and 29 CFR 1926.65;

c. A daily safety briefing before beginning work; and

d. A safety briefing by team supervisory personnel for the task/activity being performed.

I.1.J.02.05 IAW 29 CFR 1910.120, workers may be allowed on MEC projects with no known or suspected RCWM/CACM, HTRW, or Munitions Constituents (MC) contamination, for a specific limited task provided the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards. These workers will not exceed the project personnel exposure limits. These workers (such as a part-time surveyor or biologist) shall receive training equal to the degree of exposure, as established by their managers and supervisors and will include, as applicable, the following:

a. A thorough review of all sections of the WP and ESS/CSS;

b. Safety, health, and other hazards present on the project;

c. Identification of the potential hazards on the project;

d. Emergency response procedures and names of personnel and alternates responsible for project safety and health;

e. Safe use of engineering controls and equipment on the project;

f. Work practices by which the employee can minimize risk from hazards;

g. Use of PPE; and

h. Medical surveillance requirements.

I.1.J.03 OSHA and 29CFR 1910.120 requirements are not applicable for work outside the continental United States (OCONUS) in MMR projects.

I.1.K RECORD KEEPING

I.1.K.01 Contractors will maintain all training records on-site for all workers on-site.

I.1.K.02 The contractor will make these records available for government review upon request by the government representative on-site.

BLANK

CHAPTER I

SECTION 2

SAFETY PLANNING AND FIELD OPERATIONS

I.2.A GENERAL SAFETY CONCERNS AND PROCEDURES

I.2.A.01 As a general rule, all UXO and discarded MM (DMM) will be blown in place (BIP). This is the safest method to effect final disposition of munitions. Engineering controls may be required based on site-specific conditions. If authorized, UXO and DMM may be moved within the grid found for consolidated demolition shots. If a separate demolition area is set up within the Munitions Response Area (MRA)/MRS for recovered MEC, then the provisions of EP 1110-1-17 apply.

I.2.A.02 All MEC will be destroyed daily unless circumstances beyond the contractor's control (such as unexpected weather storms, unavailability of donor explosives, etc.) preclude their destruction. If a MEC item cannot be destroyed on the day of discovery, then the item will be secured and guarded until destruction can be accomplished. Under no circumstances will MEC be left unsecured overnight.

I.2.A.03 MEC operations will not be conducted until all applicable plans for the project in question are prepared and approved. Plans will be approved IAW ER 1110-1-8153 and ER 200-3-1. These plans will be based upon the concept of limiting exposure to the minimum number of personnel, for the minimum amount of time, to the minimum amount of MM consistent with safe and efficient operations.

I.2.A.04 Only UXO-qualified personnel will perform UXO procedures. As an exception, a UXO Technician I may assist in the performance of UXO procedures when under the supervision of a UXO Technician II or higher. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform UXO-related procedures

when supervised by a UXO Technician III or higher. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III or higher. ***> See DDESB TP 18 for UXO personnel ratings and qualifications.***

I.2.A.05 Prior to any action being performed on an ordnance item, all fuzing will be positively identified, if it is possible to safely do so, without disturbing the ordnance item. This identification will consist of fuze type by function and condition (armed or unarmed) and the physical state/condition of the fuze, i.e., burned, broken, parts exposed/sheared, etc.

I.2.A.06 Generally, MEC operations will be conducted only during daylight hours.

I.2.A.07 The contractor will propose a workweek schedule for each project. The proposed schedule will be submitted to the CO for approval. The CO will seek the concurrence of the PDT and resolve any other comments before making the decision to accept or reject the schedule. If the schedule is rejected, the contractor will propose a new schedule and the same process will be repeated until an acceptable schedule is approved.

I.2.A.08 There are many factors that need to be considered when developing a project schedule. A few of these factors are weather/climatic conditions, terrain, amount and type of munitions expected, available daylight, public impacts or concerns, and customer requirements. The contractor and PDT need to analyze their project dynamics to determine the appropriate schedule for their project.

I.2.B UXO/MEC ADDITIONAL PRECAUTIONS

I.2.B.01 Every effort will be made to identify a suspect MM. Under no circumstances will any MEC be moved in an attempt to make a positive identification. The MM will be visually examined for

markings and other external features such as shape, size, and external fittings. If an unknown MM is encountered, the on-site USACE representative will be notified immediately. If there is no onsite USACE representative, the MM Remedial Action District, MM Design Center, or the EM CX will be notified as soon as possible. ***> See Table III.1.***

I.2.B.02 If research of documentation is required, it will be initiated by the EM CX.

I.2.B.03 Following is additional guidance for the safe handling of MEC:

a. Projectiles containing base-detonating fuzes are to be considered armed if the round has been fired.

b. Arming wires and pop out pins on unarmed fuzes should be secured prior to moving MEC.

c. Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on MEC. Such actions may arm or activate the items.

d. Do not attempt to remove any fuze(s) from MEC. Do not dismantle or strip components from any MEC.

e. UXO personnel are not authorized to render inert any MM found on a USACE project location.

f. MEC will not be taken from the project property as souvenirs/training aids.

g. Civil War era ordnance will be treated in the same manner as any other MEC.

I.2.B.04 Prior to entering a MRA or MRS containing Improved Conventional Munitions (ICMs) or submunitions, a DA waiver will be obtained by the affected installation or the executing MM Remedial Action District for Formerly Used Defense Sites (FUDS)

properties. The waiver will be obtained IAW the requirements listed in DA Pam 385-63. The waiver will be routed through the EM CX for concurrence on FUDS properties. If an ICM or submunition is found at a project property not previously known to contain ICMs or submunitions, work will cease. If the item is found as a result of a munitions response to MEC project, then the team that discovered the item will perform the disposal. If the item is found as a result of some other activity (such as construction support), then the notification and disposal procedures identified in the approved WP will be used to dispose of the item. The discovered item will be identified, then properly disposed of (including guarding the item if disposition is to be delayed). Work will resume only when an ICM waiver has been obtained. For guidance on the preparation of waiver requests, contact the EM CX.

I.2.B.05 If at any time munitions with unknown fillers are encountered during conventional munitions response to MEC project activities, all work will immediately cease. Project personnel will withdraw along cleared paths upwind from the discovery. A team consisting of a minimum of two (2) personnel will secure the area IAW the provisions identified in the approved WP to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area. Personnel who could have been exposed to the unknown filler will not be released from the site until the presence of contamination has been verified by the 20th Support Command, 22nd Chemical Battalion, U.S. Army Technical Escort (TE).

I.2.B.06 On FUDS properties, the UXO team will notify the local Point of Contact (POC) designated in the WP. The local POC will facilitate the EOD response, and two (2) personnel will secure the location until the EOD unit's arrival. If the local POC designated in the WP is not the local law enforcement agency, then the local POC will inform the local law enforcement agency of the discovery if necessary. The EOD unit will notify the TE and secure the area until TE's arrival. After notifying the local law enforcement agency (when necessary), the executing MM Remedial Action District will notify their safety group and the EM CX of the actions taken. ***> See***

EP 75-1-3 for more detailed instructions on the procedures to take in the event munitions with unknown fillers are encountered on FUDS properties.

I.2.B.07 Do not have munitions with unknown fillers exposed to direct sunlight after excavation. Some fillers can detonate with the temperature change.

I.2.B.08 On active or Base Realignment and Closure (BRAC) installations, the UXO team will notify the POC designated in the WP.

I.2.B.09 Avoid inhalation and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.

I.2.B.10 UXO are the most dangerous MM that may be encountered. All MM, regardless of their appearance or condition, will be considered dangerous and managed as UXO until assessed otherwise by a UXO-qualified individual. MM that have experienced abnormal environments such as demilitarization by open burning, open detonation, accidents, fires or where components have been armed or affected by certain tests (e.g. fuze arming tests, jolt and jumble tests) are very unstable.

I.2.B.11 Do not rely on the color-coding of MM for positive identification. MEC having incomplete or improper color codes have been encountered.

I.2.B.12 Avoid approaching the forward area of a MM until it can be determined whether or not the item contains a shaped charge. The explosive jet, which is formed during detonation, can be lethal at great distances. Assume that all shaped-charge munitions contain a piezoelectric (PZ) fuzing system until investigation proves otherwise. PZ fuzing systems are extremely sensitive and they can function at the slightest physical change and can remain hazardous for an indefinite period of time. In some cases, merely casting a shadow across a PZ fuze can cause it to detonate.

I.2.B.13 Approach an unfired rocket motor at a 45-degree angle from the rear. Accidental ignition can cause a missile hazard and hot exhaust.

I.2.B.14 Do not expose unfired rocket motors to any electromagnetic radiation (EMR) sources. ***> See DA Pam 385-64 for safe separation distances from various sources of EMR.***

I.2.B.15 Consider an emplaced landmine to be armed until proven otherwise. It may be intentionally booby-trapped. Many training mines contain spotting charges capable of inflicting serious injury.

I.2.B.16 Assume that a practice MM contains an explosive charge until investigation proves otherwise. Expended pyrotechnic and practice devices can contain red phosphorous or WP residue. Due to incomplete combustion, this residue may re-ignite spontaneously if the crust is broken and exposed to air.

I.2.B.17 Do not approach a smoking WP munition. Burning WP may detonate the explosive burster charge at any time.

I.2.B.18 Foreign ordnance was shipped to the United States for exploitation and subsequent disposal. Every effort will be made to research all applicable documentation prior to commencement of a project involving foreign ordnance.

I.2.B.19 Appendix H contains emergency POCs.

I.2.C CONSOLIDATION OF MEC PENDING DISPOSAL

I.2.C.01 As a general rule, all UXO and DMM will be detonated in the original position found. This is the safest method to effect final disposition of munitions. Engineering controls may be required based on site-specific conditions. If authorized by the approved WP, UXO and DMM may be moved to a consolidated area for demolition IAW Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites. ***> See paragraph I.2.C.03.***

I.2.C.02 If the decision is made to consolidate the MEC that is acceptable to move, the following two conditions must be met:

a. The MEC cannot be left unattended or unsecured in the grid overnight.

b. If the MEC is to be secured within a magazine pending disposal, the magazine must be cited for this use in the project ESPs and/or safety submissions.

I.2.C.03 Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE).

a. This document covers procedures for intentional detonations only.

b. The minimum separation distance for all personnel will be the greater of the overpressure distance or the appropriate fragment range as determined by the maximum fragment range or the mitigated fragment range.

c. Overpressure Distance. The allowable overpressure distance will be determined as the scaled distance, K328, based on the total NEW of all munitions plus the initiating explosives.

d. Fragment Criteria:

(1) Maximum Fragment Range. The maximum fragmentation characteristics shall be computed IAW DDESB TP 16. The maximum fragment range shall be computed using these fragmentation characteristics with a trajectory analysis such as the computer software TRAJ. The maximum fragment range shall be the maximum fragmentation distance computed for the MGFD for a MEC area at a site, and this shall be the maximum fragment range for a consolidated shot.

(2) Fragment Mitigation. Fragment mitigation may be provided by an appropriate DDESB approved engineering control. Typical engineering controls for intentional detonation include tamping,

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

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

I.2.D TRANSPORTATION OF MM OFF-SITE

I.2.D.01 MM Transportation, Off-site. USACE contractors are prohibited from transporting UXO offsite for destruction until the provisions of Technical Bulletin (TB) 700-2 have been met. This TB states UXO must be examined by personnel qualified in EOD before transporting it from the installation or FUDS. The EOD unit will attempt to identify the ordnance and confirm in writing that the material is safe for transport.

I.2.E TRANSPORTATION OF MM ON-SITE

I.2.E.01 General. The following safety procedures will be followed for the transportation of MM that have been authorized to be moved/transported onsite:

I.2.E.01.01 Do not transport WP munitions unless they are immersed in water, mud, or wet sand.

I.2.E.01.02 If loose pyrotechnic, tracer, flare, or similar mixtures are to be transported, they will be placed in Number 10 mineral oil or equivalent to minimize the fire and explosion hazards.

I.2.E.01.03 Incendiary-loaded munitions will be placed on a bed of sand and covered with sand to help control the burn if a fire should start.

I.2.E.01.04 If an unfired rocket motor will be transported, it will be positioned in the vehicle parallel to the rear axle and secured in place with sandbags. This will afford maximum protection for the personnel operating the vehicle.

I.2.E.01.05 If a base-ejection projectile is be transported to a disposal facility, the longitudinal axis of the projectile will be oriented parallel to the rear axle and secured in place with sandbags. This will afford maximum protection for the personnel operating the vehicle.

I.2.E.01.06 MEC with exposed hazardous fillers, such as High Explosives (HE), will be placed in appropriate containers with packing material to prevent migration of the hazardous fillers. Padding will be added to protect the exposed filler from heat, shock, and friction.

I.2.F EZ OPERATIONS ***> Refer to ER 385-1-95.***

I.2.F.01 DA Pam 385-64 and ER 385-1-95 require the contractor to establish an EZ around each work area where MEC procedures are being performed. The EZ is established to protect non-essential personnel from the damaging effects of blast overpressure and fragmentation should an unintentional detonation occur. The EZ will be delineated in the approved WP, ESP, and ESS. Calculating EZ's with respect to intentional and unintentional detonations is discussed below. Approved engineering controls may be used to reduce the EZ for either intentional or unintentional detonations. On munitions response to MEC projects, it is the responsibility of the contractor's UXOSO to establish the EZ for each MRS.

I.2.F.01.01 For MEC items, to determine the Minimum Separation Distances (MSD), the following applies:

a. Intentional Detonations. The greater of the K328 overpressure distance based on the total NEW of the demolition shot, or the maximum fragment range - horizontal distance (MFR-H), will be used, as identified in DDESB TP 16. These distances may be reduced using DDESB-approved engineering controls.

b. Unintentional Detonations. The MSD for unintentional detonations will be the greater of the K40 overpressure distance or the hazardous fragmentation distance (HFD) of the MGFD, as specified in TP 16. Two exceptions to this involve MEC identified as ICMs ***> See DA PAM 385-63*** and mechanized MEC operations ***> See Chapter 12, DoD 6055.09-STD***. In this case the MFR-H will be used for this MSD.

c. If the identity of the MMs is unknown, use either Table 4-1, Generic Fragment Parameters Versus Item Diameter or Table 4-2, Generic Fragment Parameters Versus Item Net Explosive Weight, DDESB TP 16, to determine the appropriate MSD pending a specific calculation for the MEC item. Generally, use the Robust column. Typically, you will get a shorter MSD using Table 4-2, if the NEW is known. Normally, the diameter of the munition will be the one known parameter. The EM CX can assist the district/division in this process.

I.2.F.01.02 On RCWM project properties, EZ's will be established IAW EP 75-1-3.

I.2.F.01.03 TSDs. When multiple teams are working onsite, a TSD will be established. The minimum TSD will be the K40 (1.2 pounds per square inch) overpressure distance.

I.2.F.02 While MEC procedures are being conducted, only personnel essential for the operation and authorized visitors will be allowed to enter an EZ. When nonessential personnel enter the EZ, all MEC procedures will cease. In addition to this work stoppage, the following actions will be taken:

I.2.F.02.01 The individual(s) will receive a safety briefing and sign the visitors log prior to entering the EZ.

I.2.F.02.02 The individual(s) will be escorted by a UXO-qualified individual.

I.2.F.02.03 All personnel working within the EZ will comply with the following:

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

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

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

I.2.F.02.04 Any subsequent changes to EZ distances, relative to explosives safety quantity distances, as approved in the original ESS/ESPs for the project site, will require an amendment to the approved document. This amendment must be processed through the same channels as the original safety document.

I.2.G ESSENTIAL PERSONNEL AND AUTHORIZED VISITORS > ***Refer to EP 385-1-95a.***

I.2.G.01 Essential Personnel are defined as USACE and contractor project personnel necessary for the safe and efficient completion of field operations conducted in an EZ. Examples are: contractor work team members including the UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), SUXOS, and a USACE OESS, and geophysical equipment operators.

I.2.G.01.01 Tasks not necessary to the operation will be prohibited within the immediate area of the hazard produced by the operation. For USACE MMRP projects, multi-discipline and multiple MEC

project teams performing tasks required to execute the project may be in the EZ while MEC procedures are being performed as long as TSDs are maintained. This must be coordinated with the UXOSO and OESS.

I.2.G.02 Authorized Visitors are defined as DoD, DA, USACE, or other personnel (EM CX, DDESB, HQ Safety, etc.) conducting project or mission related functions, such as Quality Assurance Representatives (QARs), safety and quality inspectors (including geophysicists performing quality assurance functions), and project management. Authorized visitors must be escorted while in the EZ and be approved for entry into the EZ IAW this guidance. No more than 2 authorized visitors will be permitted in the EZ at any given time. Authorized visitors must comply with waiver requirements in EP 385-1-95a.

I.2.G.02.01 Explosives Safety Policy.

a. IAW DoD 6055.09-STD and DA Pam 385-64, it is DoD and DA policy to limit the exposure to a minimum number of persons, for a minimum time, to the minimum amount of ammunition and explosives (such as MEC) consistent with safe and efficient operations.

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

I.2.G.02.02 Personnel not needed for the operation will be prohibited from visiting. (For USACE MMRP projects, essential personnel and authorized visitors, as defined in this guidance, may visit the EZ while MEC procedures are being conducted.)

I.2.G.02.03 Responsibilities.

a. Authorized visitors will obtain written approval from the executing district's Safety and Occupational Health Office (SOHO) IAW with EP 385-1-95a.

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

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

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

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

I.2.G.02.04 Requirements and Procedures. All requests for approval as an authorized visitor for entry into the EZ during MEC procedures will be submitted through the Project Manager to the executing district's SOHO for approval. All visitor authorization requests will:

a. Describe the purpose of the visit and the tasks to be performed.

b. Explain why the tasks must be performed during MEC procedures.

c. Specify whether the visit will be a single visit or one in a series of visits.

d. State the frequency of the visits and the time required to perform the task.

I.2.G.02.05 The on-site UXOSO will ensure:

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

b. Non-essential personnel, including unauthorized visitors, are prohibited within the EZ where MEC procedures are being performed.

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

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

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

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

I.2.G.02.06 Once the personnel limits are established, the contractor has the flexibility to manage team sizes to accomplish the mission provided the personnel limits are not exceeded.

I.2.H ANOMALY EXCAVATION > *Refer to EP 385-1-95a.*

I.2.H.01 Start all excavations from the side of the anomaly. Carefully dig from the side until identification of the anomaly is made. Excavation operations, whether by hand or Earth-Moving Machinery (EMM), will employ a step-down or offset access method. Under no circumstances will any excavation be made directly over suspected MEC.

I.2.H.02 Clear debris/dirt from the subsurface anomaly only enough to permit identification of the anomaly and to apply the necessary MEC procedure.

I.2.H.03 Move with slow, deliberate motions; avoid abrupt moves.

I.2.H.04 Avoid impacting, jarring, or striking UXO.

I.2.H.05 Do not subject UXO to shock, rough handling, heat, or any other force.

I.2.H.06 Observe EMR precautions IAW DA Pam 385-64.

I.2.I ASSESSING MUNITIONS WITH UNKNOWN FILLERS

I.2.I.01 Procedures for assessing munitions with unknown fillers. ***> See EP 385-1-95a.***

I.2.I.02 For explosives and chemical safety reasons, the complete identification of recovered munitions is required before destruction or disposal. This is particularly true with regard to munitions that can be filled with CWM and could present a downwind chemical vapor hazard.

I.2.I.03 Many munitions have sufficient physical properties (such as design characteristics, markings) that allow USACE OESS and UXO personnel to positively identify the munition and the filler. However, the design or physical condition of some munitions may not allow their complete identification by visual inspection.

I.2.I.04 Munitions whose external design does not always allow for positive identification of their filler include:

a. 4.2-inch mortars (M1, M2, and the M2A1 models), and;

b. Livens projectiles (MK II (M1) and MK IIAI).

I.2.I.04.01 Because the 4-inch Stokes mortar's physical dimensions clearly indicate whether or not it contains a suspect chemical filler (for U.S. manufacture), it is not included in this list. It is recommended this guidance be used for all countries of origin of manufacture for the 4-inch Stokes mortar.

I.2.I.04.02 Because this list is not all-inclusive, the EM CX should be contacted about other munitions when questions arise.

I.2.I.05 The identification of the filler of some munitions is very difficult, if not impossible, through visual inspection when the munition has been used or otherwise impacted (for example, disposed of after ineffective treatment) or exposed to the environment (such as when buried as a means of disposal) for years.

I.2.I.05.01 Only EOD or TE is authorized to determine the most likely filler of these munitions.

I.2.I.05.02 Procedures. When performing munitions responses on USACE project properties, and the filler of a munition listed above cannot be determined, the following procedures will be followed. ***> Refer to EP 75-1-2 for additional details on procedures to be followed in the event that munitions with unknown fillers are identified on conventional munitions response to MEC project properties.***

a. On conventional munitions response to MEC project properties, contact the POC identified in the approved WP for performing the assessment or response (i.e., military EOD or TE). Typically, the WP will address how to "safe the hole / item" to

mitigate the possible downwind hazards pending the arrival of the appropriate response personnel.

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

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

d. If the assessment indicates RCWM as a filler:

(1) On a RCWM project, TE will package and secure the item per the approved CSS, usually on site.

(2) On a conventional munitions response to MEC project, TE will assume control of the item. > TE may require some logistical support during the assessment process.

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

I.2.I.06 It is important that terminology used not cause unnecessary public or regulatory concern. Generally, these munitions should be referred to as munitions with unknown fillers, rather than suspect chemical munitions.

I.2.J MEC DISPOSAL OPERATIONS *> Refer to EP 385-1-95a.*

I.2.J.01 All disposal operations will be conducted IAW TM 60A-1-1-31, EP 1110-1-17, and the unnumbered U.S. Army Engineering and Support Center, Huntsville (USAESCH), publication entitled “Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites”.

I.2.J.02 As a general rule, all disposal operations will be accomplished by electrical means to ensure maximum safety. There are exceptions to this requirement in situations where static electricity or EMR hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). The following precautions from DA Pam 385-64 are to be followed:

I.2.J.02.01 Premature detonation of electric blasting caps by induced current from radio frequency signals is possible. Refer to DA Pam 385-64 for minimum safe distance with respect to transmitter power and indication of distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

I.2.J.02.02 Lightning is a hazard with respect to both electric and non-electric blasting caps. A direct hit or a nearby miss is almost certain to initiate either type of cap or other sensitive explosive elements such as caps in delay detonators. Lightning strikes, even at distant locations, may cause extremely high local earth currents that may initiate electrical firing circuits. Effects of remote lightning strikes are multiplied by their proximity to conducting elements such as those found in buildings, fences, railroads, bridges, streams, and underground cables or conduits. The only safe procedure is to suspend all blasting activities when an electrical storm approaches to within 5 miles of the project location.

I.2.J.02.03 Electric power lines also pose a hazard with respect to electric initiating systems. It is recommended that any disposal operation closer than 155 meters (517 feet) to electric power lines be done with a non-electric system.

I.2.J.03 The only acceptable disposal method is the one stated in the appropriate TM 60 Series manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.

I.2.J.04 If justified by the situation, protective measures to reduce shock, blast overpressure, and fragmentation will be taken. The

EM CX will assist in any design work and will review for approval all proposed protective measures.

I.2.J.05 MSDs for personnel during MEC disposal operations will be IAW DoD 6055.09-STD, TP 16, or the distance provided by the EM CX.

I.2.J.06 During open detonation operations, personnel will be located away from lifting lugs, strong backs, base plates, etc.

I.2.J.07 Once disposal operations are completed, a thorough search of the immediate area will be conducted with a magnetometer to ensure that a complete disposal was accomplished.

I.2.J.08 Inert ordnance will not be disposed of as scrap until the internal fillers/voids have been exposed and unconfined.

I.2.K CELL PHONE USE ***> Refer to Section 29 and 33 EM 385-1-1.***

I.2.K.01 Cell phones with less than one watt shall be kept at least eight feet from a blasting circuit.

I.2.K.02 Contact should not be made between the blasting circuit and the cellular telephone antenna and charging jack.

I.2.K.03 Restrict the use of cellular telephones in the grids and during blasting operations.

I.2.K.04 If it is suspected that a blasting circuit is at approximately the same elevation as a nearby cellular telephone tower's antenna cluster, then the radio frequency field strength measurements should be made at the location of the blasting circuit and competent expert advice should be sought.

I.2.L OSHA INSPECTIONS

I.2.L.01 In the event an OSHA inspection team comes onto the MMRP site, the following procedures should be followed by the Prime contractor on-site:

a. Ask the OSHA team for its credentials.

b. Provide an inbriefing/safety briefing to the OSHA team.

c. If the OSHA team wants to go into the EZ, explain to them the MEC and MEC-related procedures will have to be shut down while they are in the EZ.

d. Notify the USACE Project Manager of the presence of OSHA on the project site.

e. Ensure the OSHA personnel are in the appropriate PPE before allowing them to go downrange. Advise them of the requirements.

f. Be courteous and give them the assistance necessary during their visit.

g. Ensure Headquarters USACE Safety Office is advised of the OSHA visit.

h. Notify the USACE PM and HQUSACE of any findings of non-compliance or non-conformance rendered by the OSHA team.

i. OSHA does not normally apply to OCONUS work.

I.2.M DDESB VISITS *> Refer to DoD 6055.09-STD and AR 385-64.*

I.2.M.01 DDESB will periodically visit USACE MMRP sites in order to conduct an ESS. The purpose of the survey is to assess explosives safety conditions with respect to storage, treatment, transportation, handling, and disposal of munitions and explosives

of concern. Typically the survey will include restricted access areas and organizations on site involved in the MEC Response activities.

I.2.M.02 Areas of concern during the survey are:

a. Name of FUDS, official mailing address, and summary of the MEC response effort;

b. Name, rank, position/title, E-mail address, and telephone numbers of key personnel;

c. Provide an up-to-date map showing location of all areas that have MEC activities ongoing dealing with subjects listed in paragraph I.2.M.01;

d. List of operations involving ammunition or explosives scheduled during the survey;

e. Brief summary of explosives accidents that have occurred since the last survey to include cause, damage, and corrective actions;

f. Discussion on any difficulties in achieving compliance with explosives safety requirements due to environmental requirements;

g. Permission for the survey team to photograph areas of interest during the survey;

h. Discussion on other significant problem areas that the DDESB should be aware of or may be of assistance in resolving.

I.2.N EXPLOSIVES STORAGE AND MAGAZINES

I.2.N.01 General. This section applies to MEC and Commercial Explosives Storage. ***> See 27 CFR 555, EP 385-1-95a, EM 1110-1-4009.***

I.2.N.02 On DoD installations, DoD 6055.09-STD and Service requirements (Army – AR 385-64; Navy – Naval Sea Systems

Command Ordnance Pamphlet (NAVSEA) OP 5; Air Force – AFM 91-201) will be met. For the remainder of this pamphlet, reference to DoD standards (such as DoD 6055.09-STD) also implies that Service explosives safety publications will be adhered to. Generally, the contractor may be able to use an existing explosives storage facility on an installation that meets DoD standards. If not, the contractor will establish a temporary storage facility. The compatibility of explosives defined in DoD 6055.09-STD, will be followed. Recovered munitions awaiting final disposition will not be stored with serviceable explosives. Commercial explosives will be assigned a DoD hazard classification (for example, 1.1, 1.2, etc.) and storage compatibility grouping by the USATCES prior to being stored on a military installation. ***> See Chapter II, Table II.1 for a current listing of commercial explosives that have been assigned a DoD hazard classification.***

I.2.N.02.01 When a project is being conducted on an installation and the installation has an approved storage facility, and permission to store the demolition explosives in an approved storage facility is obtained from the installation and/or MACOM, as applicable, the explosives will be stored IAW the approved procedures used by the installation. Otherwise, the contractor will establish a temporary storage area using ATF, Type II magazines. Installations require MACOM/DRU approval for storage of commercial explosives. Contact the EM CX for procedures to be used to obtain MACOM/DRU approval.

I.2.N.03 Off DoD installations, the contractor will be responsible for establishing a temporary explosives storage area. This temporary explosives storage area will meet local, state, 27 CFR 555, 29 CFR 1910.1201, and DoD 6055.09-STD requirements to the greatest extent practicable.

I.2.N.04 Temporary Explosives Storage Area.

I.2.N.04.01 Explosives Magazine Siting.

I.2.N.04.02 Explosives magazines on MEC projects are typically BATF Type II magazines. These magazines meet the

requirements of AR 190-11 for the storage of donor explosives and in some cases, the storage of recovered MEC awaiting disposal.

I.2.N.04.03 Explosive safety quantity distances applicable to these types of magazines are specified in DoD 6055.09-STD, Chapter 9.

I.2.N.04.04 HFD. This is the distance all non-project personnel/non-essential personnel will be kept away from the magazine at all times.

a. For bulk donor charges, this distance is determined by the maximum NEW of the donor charges to be stored in the magazine and applying this explosive weight to the Tables in DoD 6055.09-STD. For all Hazard Division 1.1 donor charges, in quantities below 450 pounds, the HFD listed in Table C9.T2, under the "Structures" column will be used for determining this distance. For quantities above 450 pounds, see DoD 6055.09-STD.

b. For recovered MEC awaiting disposal, normally all recovered MEC will be Hazard Division 1.1, per TB 700-2. Determine the maximum NEW to be stored, based on the total of all the NEWs of the MEC items and apply this explosive weight to the Tables in DoD 6055.09-STD. For all Hazard Division 1.1, in quantities below 450 pounds, the HFD listed in Table C9.T2, under the "Open" column will be used for determining this distance. For quantities above 450 pounds, see DoD 6055.09-STD.

I.2.N.04.05 Public Traffic Route Distance (PTRD). This is the distance to be maintained between a Potential Explosive Site (PES) and Public Traffic Route (PTR) exposure.

a. For HD 1.1 in quantities below 450 pounds, this distance is equivalent to 60% of the HFD.

b. There are three categories of traffic density identified in the DoD 6055.09-STD that will have a direct impact on determining this distance.

(1) High Traffic Density. If the route has 10,000 or more car or rail passengers per day, or 2,000 or more ship passengers per day, then the Inhabited Building Distance (IBD) criteria apply.

(2) Medium Traffic Density. If routes have between 400 and 10,000 car or rail passengers per day, or between 80 and 2,000 ship passengers per day, then 60% of specified minimum fragment distance for IBD applies. As a minimum, these criteria apply to any recreational activity that is extensive and occurs on a regular basis.

(3) Low Traffic Density. If routes have fewer than 400 car or rail passengers per day, or fewer than 80 ship passengers a day, then no minimum fragment distance is required. Minimum distance shall be based on blast criteria (K24/K30).

I.2.N.04.06 Siting the magazine relative to MEC Operations.

a. There are no distance restrictions from the magazine to project personnel conducting project business.

b. MEC operations that could produce an unintentional detonation must be kept at a minimum of K11 distance from the magazine. This K11 distance is determined by taking the cube root of the NEW of the MGFD for the area and applying the K factor to that figure. For example, if the MGFD's NEW was 1 pound of TNT, then the K11 distance for those operations that might produce an unintentional detonation is 11 feet.

c. For MEC operations that involve intentional detonations, those operations must be kept at the MFR-H (for fragmenting munitions) or the K328 distance of the NEW of the munition being disposed, plus the NEW of the donor charge to destroy it.

d. For those MEC operations using engineering controls to reduce the fragmentation distance, adjust these locations accordingly.

I.2.N.04.07 Recovered MEC will not be stored in the same magazine as the donor charges to be used for its disposal.

I.2.N.04.08 It is acceptable to use the BATF Type II magazine with the external cap box mounted on the outside of the magazine and site the unit as one unit, using the combined NEW of both the initiators and the donor charges.

I.2.N.05 Siting Magazines at Operational Installations.

I.2.N.05.01 On-Post Roads. For magazines supporting munitions response to MEC work at operational installations, on-post roads are normally not considered PTRs and no Quantity Distance (QD) applies from the magazine to them. Exceptions are as follows:

a. On-post roads open to the public are PTRs;

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

I.2.N.05.02 Installation Personnel and Operations.

a. Installation ammunition personnel and operations. Site the magazine at the intraline distance to these exposures. **>** ***Magazine distance applies from installation explosives locations to magazines supporting munitions response to MEC projects.***

b. Installation non-ammunition personnel and operations. Site the magazine at the IBD to these exposures.

I.2.N.05.03 Lightning Protection for Explosives Storage Areas.

a. Each magazine will be provided lightning protection IAW chapter 12, DA Pam 385-64. The provisions of the National Fire Protection Association (NFPA) 780, which are consistent with Army guidance, may be used to supplement Army guidance where necessary.

b. DoD 6055.09-STD requires functional lightning protection for all explosives storage areas.

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

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

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

f. NFPA 780 allows the metal walls of the magazine to act as both the air terminal and down conductor of a LPS, provided the portable magazine meets the following criteria: magazines manufactured entirely from metal that are at least 3/16 inches thick and that have doors bonded to the side of the magazine. ATF-approved, portable Type II magazines meet these criteria. Lightning protection is completed by grounding the magazine IAW EM 1110-1-4009, Chapter 11; however, the grounding system will be inspected and tested IAW DA Pam 385-64. The Interim Holding Facilities (IHF) used for Recovered Chemical Warfare Materiel (RCWM) projects do not meet these criteria; therefore, they will have a LPS designed, installed, and tested prior to use, if the IHF is to be sited for explosively-configured RCWM. If the IHF is not sited for explosively configured items, a LPS is not required.

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

I.2.N.06 Munitions Debris (MD) Storage Inside the Fenced Explosives Storage Area. Certified, verified, containerized MD may be stored in the fenced explosives storage area. However, the MD containers will be made of non-flammable materials. Wood or cardboard containers are not acceptable as they constitute a fuel source in case of fire near the magazine.

I.2.N.07 Fire Protection.

I.2.N.07.01 A fire plan for either an on-installation or off-installation explosives storage facility will be prepared and coordinated with the local fire department.

I.2.N.07.02 Clear all combustible material a minimum of 15.25 meters (50 feet) around portable magazines. Do not store any combustible materials within 15.25 meters (50 feet) of any magazine.

I.2.N.07.03 Placarding.

a. On DoD Installations. Affix a fire symbol to the magazine IAW DA Pam 385-64.

b. FUDS and Other Munitions Response to MEC Projects Not on DoD Operational Installations. Placarding of magazines will be performed IAW local rules and regulations.

c. Routine emergency response drills will be conducted IAW the approved WP to familiarize the response personnel with the hazards.

I.2.N.08 Physical Security. A physical security survey will be conducted IAW AR 190-11 to determine if fencing or guards are required. For BRAC or active installations the physical security survey will be coordinated through the Provost Marshall's office. For FUDS, this survey will be coordinated with local law enforcement agencies.

I.2.N.08.01 Generally, a fence around the magazine is not needed, IAW 27 CFR 555. However, the degree of protection needed to prevent the theft of the MM will be provided.

I.2.N.08.02 USACE contractors must be aware of 49 CFR 172, Subparts H and I concerning the offering, preparing, or transporting of designated hazardous materials, as well as the necessary security requirements.

I.2.N.09 Magazines for Storage of RCWM. ***> Refer to EP 75-1-3 for RCWM IHF siting requirements.***

I.2.N.10 Requirements for the physical security of a RCWM IHF are contained in EP 75-1-3.

I.2.O APPROVED ENGINEERING CONTROLS FOR BLAST AND FRAGMENTATION MITIGATION

I.2.O.01 General. DDESB Technical Paper 15 contains a listing of all approved engineering controls.

I.2.O.02 Engineering Controls. Engineering controls are used to mitigate the effects of unintentional or intentional explosions if the calculated MSD for the MEC to be destroyed cannot be met. The primary goals of using engineering controls are to improve personnel safety and/or to reduce the EZ. This section discusses engineering controls that can be used by the PDT for either an unintentional or intentional explosion scenario.

I.2.O.02.01 Engineering Controls for Unintentional Detonations. Engineering controls used for unintentional detonations include various barricades. The PDT should design barricades IAW approved DoD standards. To implement a barricade that has been previously approved by DDESB, the PDT should contact the EM CX. ***> See DDESB TP 15.*** If a barricade has not been previously approved, a complete structural design package will be submitted to the EM CX as part of the ESP/ESS. The structural design package will include design drawings, design details, calculations, drawings, and relevant testing details. The design will show how

fragmentation is captured and overpressure is reduced. The design package, as part of the ESP/ESS, is forwarded through appropriate channels to DDESB for approval.

I.2.O.02.02 Engineering Controls for Intentional Detonations. The most common engineering controls used during intentional detonations are either soil cover or sandbags. If controls are required for intentional explosions, the MM DC should be contacted to arrange for the preparation of a design (or the review of a design already prepared) with the EM CX.

a. Soil Cover. If soil is proposed to be used over a to-be-detonated MEC item, the PDT may use one of several computerized models to determine the required thickness of soil cover necessary for the intentional detonation of MEC. The Buried Explosion Module (BEM) is one such computerized model. The methodology used in the BEM is documented in DDESB TP 16 and an EXCEL spreadsheet is available with DDESB TP 16 on the DDESB Secure Website.

b. Sandbags. Sandbags may be used for MEC no larger than 155 mm. If sandbags are proposed to be used as an engineering control to mitigate the fragmentation and overpressures generated during an intentional MEC detonation, the PDT should refer to HNC-ED-CS-S-98-7 and the Fragmentation Characteristics Database with DDESB TP 16.

c. Barricades. There are a number of approved barricades that may be used for the mitigation of fragments, such as the open front barricade, enclosed barricade, and the miniature open front barricade. A comparison, siting, and selection procedure for various barricades can be found in HNC-ED-CS-S-96-8, Revision 1.

d. Water Barriers. In some instances it may be necessary to use water as a mitigating agent for the control of blast effect and fragment containment resulting from the intentional detonation of munitions. HNC-ED-CS-S-00-3 contains the requirements necessary when using water as a mitigating agent. Munition

specific requirements are available in the Fragmentation Characteristics Database with DDESB TP 16.

e. Contained Detonation Chambers. Another engineering control that may be proposed for the intentional detonation of MEC is a Contained Detonation Chamber (CDC). CDCs are designed to capture all fragmentation from the detonated MEC and will be approved by DDESB for the intentional detonation of MEC.

I.2.P USE OF DDESB TP 16 FOR DETERMINATION OF EZs

I.2.P.01 DDESB TP 16 details the approved methods for the calculation of theMFR-H, the HFD (i.e. 1/600 distance), and the BEM. There is a Fragmentation Characteristics Database, an EXCEL Spreadsheet for the "default" distances based on diameter and net explosive weight for items not in the database, and an EXCEL Spreadsheet for the BEM associated with DDESB TP 16. The DDESB TP 16, the database (and instructions for its use) and the spreadsheets are all available on the DDESB Website (go to www.ddesb.pentagon.mil). All personnel involved in MEC response actions should ensure that they have a login and password for this website.

I.2.P.02 The DDESB TP 16 Fragmentation Characteristics Database includes all distance information required for determining the MSD as well as information required for engineering controls for many munitions.

I.2.P.03 If a munition is not listed in this database, there are Tables in DDESB TP 16 for determining the MFR-H and the HFD based on either munition diameter or NEW.

I.2.Q ESP, ESS, and CSS

I.2.Q.01 DoD 6055.09-STD, Ammunition and Explosives Safety Standards and DA Pamphlet 385-64 require the preparation, submittal and approval for ESP/ESS/CSS for USACE MMRP work in the following circumstances:

I.2.Q.01.01 A DDESB-approved site plan, ESS, or CSS before the start of munitions response activities (such as field activities) that involves the placement of explosives on a site; the intentional physical contact with MEC or chemical agents (CA) regardless of CA configuration; or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain MEC or CA; or

I.2.Q.01.02 A USATCES-level explosives safety office review and approval pending DDESB review and approval provided the submission is at DDESB for review and approval and the USACE accepts that the DDESB approval may impose different or additional munitions or CWM response requirements.

I.2.Q.02 An ESS/CSS is required for the following types of MMRP work:

a. A determination of NDAI;

b. TCRA;

c. Construction Support for those locations where the probability of encountering MEC has been determined to be moderate to highly probable;

d. Execution of the explosives safety or CA safety aspects of the selected response (post investigative/characterization work);

e. Institutional/Engineering Controls; and/or

f. CSS.

I.2.Q.03 An ESS/CSS/ESP/chemical site plan (CSP) is not required for:

a. Munitions or explosives emergency response;

b. Preliminary assessments (PA) or site inspections (e.g., site visits in conjunction with an archival search) when intentional

physical contact with MEC or CA or the conduct of ground-disturbing or other intrusive activities is not intended;

c. Clearance activities on operational ranges. (Addressing MM burial sites on operational ranges is not a clearance activity);

d. Munitions response of former ranges used exclusively for training with small arms ammunition; or

e. On-call construction support – “Low Probability”. “Stand-by” construction support is appropriate.

(1) A “low” determination may only be assigned to those areas for which a search of available historical records and onsite investigation data indicates that, given the military or munitions-related activities that occurred at the site, the likelihood of encountering MEC or CA, regardless of CA configuration, is low.

(2) Munitions-related activities that may merit a “low” determination include, but are not limited to, the former use of the area for live-fire training exclusively with small arms ammunition; for maneuver training, to include maneuver training involving the use of smokes, pyrotechnics, and simulators; as firing points; for munitions inspection, handling, storage, or transfers, to include residue points and inert storage yards; for air defense; or as munitions operating facilities. The exceptions are facilities in which the processes used might have resulted in the generation of concentrations of munitions constituents high enough to present an explosive hazard. Areas on which previous responses have been completed may also qualify for “low” determinations.

(3) Immediate reassessment by the responsible authority of the level of construction support required is appropriate upon the discovery of MEC or CA, regardless of CA configuration.

f. Anomaly avoidance activities.

(1) The use of anomaly avoidance techniques is appropriate on properties known or suspected to contain UXO or other munitions

[such as for DMM] that may have experienced abnormal environments to allow the below activities in such areas while avoiding surface explosive or CA hazards and, when necessary, subsurface anomalies. Anomaly avoidance is used when:

(a) Surface MEC or CA, regardless of CA configuration, will be avoided during any activities that require entry to the area (for example, collections of environmental samples, the conduct of cultural resource studies).

(b) Subsurface anomalies will be avoided during any intrusive work (such as drilling environmental monitoring wells).

(2) During anomaly avoidance:

(a) Escort support must be provided by EOD personnel, or:

(b) Within areas known or suspected to contain MEC, excluding CA, regardless of configuration, by:

(i) UXO-qualified personnel; or

(ii) UXO Technician I personnel under the supervision of UXO-qualified personnel. The responsible commander or authority may, based on a risk assessment and implementation of methods to mitigate any potential exposures, approve UXO Technician I personnel to perform escort duties without supervision.

(c) Within areas known or suspected to contain CA, regardless of configuration, to include areas where such CA is commingled with other MEC, by UXO-qualified personnel trained in CWM responses.

(3) Explosives safety requires that discovered surface MEC or CA, regardless of CA configuration, be avoided and their location noted and reported to appropriate authorities.

(4) Detected subsurface anomalies must not be investigated, but they shall be marked, when appropriate, and avoided.

I.2.Q.04 Format and contents of ESS/CSS. Call the EM CX for additional guidance and information on the submittal of ESS/CSS.

I.2.Q.04.01 Non-Time Critical Removal Action (NTCRA).
> See Appendix V.

I.2.Q.04.02 Time Critical Removal Action (TCRA).
> See Appendix W.

I.2.Q.04.03 No DoD Action Indicated (NDAI) or No Further Action (NOFA).
> See Appendix X.

I.2.Q.04.04 Construction Support.
> See Appendix Y.

I.2.Q.04.05 Institutional/Engineering Controls.
> See Appendix U.

I.2.Q.04.06 Chemical Safety Submission (CSS).
> See Appendix T.

I.2.Q.04.07 Explosive Siting Plan (ESP).
> See Appendix P.

I.2.Q.05 Not Used.

I.2.Q.06 Not Used.

I.2.Q.07 Not Used.

I.2.Q.08 Not Used.

I.2.Q.09 Not Used.

I.2.Q.10 There are several contract DIDs in place for past, present, and future contracts with USACE for MMRP work, as well as Interim Guidance Documents (IGD). Some of these IGD/DIDs

prescribe certain formats and contents for these types of documents. In case of conflict between the DoD Standard and USACE policy and contractual documents, contact the EM CX for clarification.

I.2.Q.11 For categories of changes to site plans and safety submissions refer to paragraph I.1.A.03.07.

I.2.Q.12 Routing for site plans/submissions is as follows:

I.2.Q.12.01 FUDS.

a. The Design Center will submit the plan/submission to the EM CX for the DRU approval memorandum.

b. The EM CX will forward on to USATCES. The EM CX will resolve any comments with USATCES.

c. USATCES will forward onto DDESB with an Army approval memorandum.

d. USATCES will usually resolve any comments with DDESB.

I.2.Q.12.02 BRAC.

a. The Design Center will submit a Corps or Corps contractor generated ESP/ESS for work done on BRAC installations to the EM CX for review and DRU approval memorandum for the Corps organization's participation in the project activities, from an explosives safety perspective.

b. Normally, the BRAC will submit the ESP/ESS up through their chain of command for review and approval and from their chain of command to USATCES for Army review and approval; Naval Ordnance Safety and Security Agency (NOSSA) for Navy review and approval; and the Air Force Safety Center (AFSC) for Air Force Review.

c. If the BRAC office wants USACE to submit the ESP/ESS up through the chain of command for the Service review and approval, the BRAC office will need to designate this in a memorandum or an e-mail attesting to this and that document will become part of the submittal package up to the Service office.

d. If the Design Center is performing this function for the BRAC, provide the BRAC request, when the ESP/ESS is submitted for the USACE review and approval to the EM CX.

I.2.Q.12.03 Active DoD installations. The servicing Design Center will follow the process and procedures in paragraph I.2.Q.12.02, except substitute Installation point of contact in lieu of BRAC.

I.2.Q.12.04 Work for Others (WFO). If work is being done that involve an ESP/ESS in WFO, the ESP/ESS will be submitted to the EM CX for DRU approval before being sent to the customer.

I.2.Q.13 Review and Approval Timelines. Normally, the review and approval for USACE ESP/ESS, at USATCES will take approximately 2 weeks, once USACE provides them with a high quality document and all comments are resolved. Review and approval times at other Service safety offices are variable. DDESB review and approval for ESP/ESS is normally 2 weeks for FUDS. Due to the nature and number of different offices involved in Active and BRAC facilities and installations that duration is variable as well.

I.2.Q.14 Interim Army Approvals. In the event a project timeline cannot be controlled or a response approval is needed that would require lesser time, as identified above for the review and approval, the requesting organization can request an Interim Army Approval to begin the work ahead of the DDESB approval. This request will need to identify the reason an interim approval is being requested. Normally this can be the inordinate cost to the project should work not be started by a certain date or political pressure to begin work as soon as possible, as an example.

I.2.Q.14.01 USATCES can grant an Interim approval in these cases. This Interim Approval is predicated on the requestor being aware of the following conditions that may be imposed upon the project team in this event:

a. The proposed ESP/ESS is at DDESB for review and approval, and

b. The Service accepts that the DDESB approval may impose different or additional munitions response requirements.

I.2.Q.15 Per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Defense Environmental Response Program (DERP) and FUDS guidance, An Action Memorandum (AM) or Decision Document (DD) will precede an ESS/CSS for a Response Action. The safety submission will parrot the selected removal response in the AM/DD. An AM/DD is not required for an ESP.

I.2.Q.16 After-Action Reports (AAR). An After-Action Report is required for all completed munitions responses that have a DDESB approved ESS/CSSs. ***> See paragraph C12.7 of DoD 6055.09-STD and EP 385-1-95b for format and content.***

I.2.Q.17 All FUDS site plans and submissions will be submitted electronically to the EM CX. For large files, (in excess of 5 megabytes) place the file on a file transfer point (ftp) and notify the EM CX via e-mail of the location, file name, log-in, password, and the length of time the file will be on the ftp and when it is available for download. Once it is downloaded, the EM CX will notify the sender, via e-mail, when it has been downloaded and the review process has started.

I.2.Q.17.01 The EM CX has had very successful results using the Aviation and Missile Research Development Engineering Center (AMRDEC) ftp for uploading large electronic files, specifically site plans and submissions with maps and figures. This ftp: https://safe.amrdec.army.mil/SAFE/ will require you to manually enter each recipient's e-mail address, and manually upload the files

to their website. The process is very user-friendly. The best feature of this website is that you can select to be notified when the file has been downloaded by the person you sent it to, and the system will generate a specific password to that receiver for them to use to download the document, a very safe ftp. You can have the notification sent to civilian contractors' e-mail as well. If you choose to send the notice to a non ".mil" e-mail address, you will have to use your Army Knowledge On-line (AKO) log-in to permit the ftp to notify the recipient via e-mail to go in and pick up the files.

I.2.R Not Used

I.2.S PRE-OPERATIONAL SURVEYS

I.2.S.01 All USACE Recovered Chemical Warfare Materiel (RCWM) projects will have a Pre-Operational Survey, hereafter called "Survey", conducted and successfully completed on the site prior to any intrusive activities. Headquarters, United States Army Corps of Engineers (HQUSACE) is responsible for the execution of the Survey, as the DRU. HQUSACE has delegated the responsibility for the conduct of the Survey to the Commander, U.S. Army Corps of Engineers, U.S. Army Engineering and Support Center (CEHNC), Huntsville, Huntsville, Alabama. The Environmental and Munitions Center of Expertise (EM CX) within CEHNC will lead the Survey.

I.2.S.02 All planned RCWM response actions must undergo a Survey prior to the start of operations. This includes sampling efforts, if the intent is to dig to an anomaly, and there is a potential to encounter RCWM, or if provisions are made to store RCWM. Surveys are valuable and necessary tools in the preparation of chemical agent operations at response action projects. Surveys are intended to judge the readiness of those organizations performing response actions activities to operate in a safe and healthful manner and are the final step in gaining approval to conduct operations. Surveys are not training events, nor are they the time to draft safe work procedures. It is the responsibility of the Project Manager (PM) to have response personnel fully trained,

practiced, and prepared for the Survey prior to arrival of the Survey team.

I.2.S.03 The Survey evaluates planned activities relative to safety, health, environment, and operational readiness and recommends whether the planned activities should be allowed to transition to chemical agent operations. Survey teams will consist of subject matter experts from the organizations listed below, as available. The Survey will be conducted under the direction and control of the U.S. Army Corps of Engineers. Survey team members will be selected based on technical background and areas of expertise. The Project Delivery Team (PDT) consists of any personnel responsible for the execution of the project on the ground. Under no circumstances will members of the PDT serve as evaluators on the Survey Team. This is necessary to preclude any possibility of biased participation. The EM CX will select the team members and serve as the Survey Team Leader. The organizations below will be invited to participate in the Survey. However, based on availability, the minimum acceptable number of personnel required to participate on the Survey team as evaluators will be three: the EM CX (lead), one participant from the United States Army Technical Center for Explosives Safety (USATCES), and one from any of the other organizations identified as evaluators listed below:

a. The PM for the site (both District and CEHNC) or Installation Commander (non-evaluator).

b. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) (evaluator).

c. Each agency responsible for executing on-site RCWM activities (e.g., The 22nd Chemical Battalion TE (Technical Escort Unit), U.S. Army Research Development and Engineering Command, Edgewood Chemical and Biological Command (ECBC) (evaluator).

d. Program Manager for the Elimination of Chemical Weapons (PMECW) (evaluator).

e. HQ USACE Safety and Occupational Health Office (CESO) (evaluator).

f. For active installations and BRAC project sites, or Work for Others, the corresponding Safety offices will be invited to attend (non-evaluator).

I.2.S.04 Surveys will examine all aspects of chemical agent operations and emergency response activities. The Survey team will review pertinent documentation, inspect selected processes, support equipment and facilities, as appropriate, and witness selected activities and operations. Operations during Surveys will be conducted as though chemical agent and/or explosives were present. If specific simulations or deviations from this concept are required, they must be approved by the Survey team leader before the start of the Survey and explained in the Survey report. The need for significant simulations or deviations may indicate that the system is not ready to operate, precluding successful completion of the Survey (e.g., having to simulate that the chemical agent filtration system (CAFS) (if used) is fully operational due to mechanical difficulties, or other similar instances). All approved Standing Operating Procedures (SOPs), WPs, checklists, maps of the project site, a copy of the Chemical Safety Submission (CSS) and approval documents, environmental requirements, security plan, and other documentation will be provided to team members prior to the Survey. Any documentation needed by or requested by Survey team members will be made available on site or, if requested, prior to the Survey. Fourteen days prior to the projected date of the Survey, the PM will provide 5 CDs with copies of all site documents discussed above to the EM CX for distribution to the Survey Team Members.

I.2.S.05 Deliberate unearthing, exposing, accessing, or contacting RCWM is not permitted until all required CSS approvals are obtained and a Survey has been successfully completed.

I.2.S.06 Operational personnel will perform a dry run in the presence of EM CX and Site Safety personnel prior to the restart of any RCWM operation that has not been conducted in the last 90

days. The EM CX, in coordination with project safety personnel, will determine the actions required to verify readiness. These actions will be based on the scope of operations and length of delay between the initial Survey and the re-start of operations and may result in conducting another Survey.

I.2.T DETECTION METHODS AND EQUIPMENT
> See EM 1110-1-4009.

I.2.U MECHANIZED MEC PROCEDURES

I.2.U.01 Sifting Operations.

I.2.U.01.01 When sifting operations are being conducted, essential personnel will be afforded blast and fragment protection through the use of shielding, PPE, and/or distance. The requisite shielding is identified within the fragment calculation sheet from the Fragmentation Database for the MEC item(s) expected to be encountered. ***> See DDESB TP 16.*** Additionally, all essential personnel will be provided K24 overpressure protection via PPE or distance.

I.2.U.01.02 All sifting operations will have the capability of being remotely shut down from a "Kill" switch located at, or outside of the K24 distance.

I.2.U.01.03 All non-essential personnel will be kept outside of the Maximum Fragment Range-Horizontal during mechanized MEC procedures involving sifting.

I.2.U.01.04 All safety plans involving sifting operations will include procedures on how to handle MEC items that are discovered within the sifting mechanical structures.

I.2.U.02 Dredging Operations.

I.2.U.02.01 Explosive safety concerns from MEC exposures in a dredging environment are similar to those on land. In addition to the normal heat, blast, shock, and fragmentation effects of a detonation

on land, the consideration of the effects of a detonation underwater must also be taken into account. The blast wave from underwater detonations can amplify the damage to the superstructure being used for dredging operations.

I.2.U.02.02 One of the key points of any dredging operation is to prevent the MEC from getting to the surface of the barge and or shoreline. This can be done through installing screening devices onto the cutter heads or dredging heads to limit the flow of any subsurface debris or items through the ducting of the dredging system. Normally the screening restrictions are designed to permit the maximum flow of material and water and prevent any items that meet certain physical dimensions from entering the flow of material. This size is normally determined by the smallest size of MEC anticipated to be encountered.

I.2.U.02.03 Underwater blast calculations can be obtained from the EM CX for determining shielding, distance requirements, etc., for underwater MEC considerations.

I.2.U.02.04 Recovered MEC from dredging operations may require disposal on the barge or platform conducting the dredging, or when it gets deposited on the barge/beach area. Dredging operations that have knowingly or inadvertently dredged MEC items during sediment placement may require an MEC clearance operation to reduce the exposure of the public and site workers to MEC hazards. Contact EM CX for additional assistance in this area.

I.2.U.02.05 An ESS/ESP may be required for the MEC operation involving dredging techniques. Contact EM CX for additional assistance in this area.

I.2.U.02.06 The potential for encountering MEC on any dredging project that is classified as 'new work' is moderate to high. Maintenance dredging, in previously dredged areas, will not normally be expected to encounter MEC unless the dredging site is within an active range area.

I.2.U.03 Earth Moving Machinery (EMM) Procedures.

> See EP 385-1-95a.

I.2.U.03.01 For Removing Soil Overburden.

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

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

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

d. There is no need to harden/shield the EMM to protect its operator when EMM is used to remove the soil overburden to within 12 inches from the anomaly.

I.2.U.03.02 For Intentional Excavation of MEC.

a. Procedures for use of heavy equipment (earth moving machinery or EMM) to assist in the excavation of Munitions and Explosives of Concern (MEC).

(1) If the intent of the Mechanized MEC procedure is to intentionally dig up anomalies that could be MEC, without practicing anomaly avoidance techniques, the equipment must be hardened/armored appropriately and the operator must be afforded protection for blast overpressure to the K24 factor by either distance or PPE. Using hearing protection that will reduce the sound by ≥9 will reduce the distance to the K18 factor.

(2) If mechanized MEC procedures are being performed, the MSD for unintentional detonations for non-essential personnel will be the MFR-H.

CHAPTER I

SECTION 3

OESS RESPONSIBILITIES AND AUTHORITIES

I.3.A GENERAL

I.3.A.01 The OESS is responsible for:

I.3.A.01.01 Conducting reviews of MMRP project documents for proper application of explosives safety requirements.

I.3.A.01.02 Conducting periodic quality assurance inspections (QAI) of contractor MMRP operations with regard to applicable explosives safety requirements. ***> See Appendix G.***

I.3.A.01.03 Periodically review contractor UXO personnel to ensure they meet minimum qualifications for the positions and duties being performed.

I.3.A.01.04 Coordinate and integrate EOD and TEU responses with the contractor operations, as required.

I.3.A.01.05 Conduct other quality assurance as defined in the project Quality Assurance Surveillance Plan (QASP) to ensure that the contractor is complying with the project WP, Quality Control Plan (QCP) and Site Safety Health Plan (SSHP).

I.3.A.01.06 Ensure accidents are reported IAW contract requirements and DA PAM 385-40.

I.3.A.02 Procedures.

I.3.A.02.01 The OESS has stop-work authority on project sites for any life threatening situations.

a. If at any time during daily operations at the project site, the OESS observes a condition or practice that poses a safety hazard, he will:

(1) Instruct the person to immediately stop the hazardous activity;

(2) Identify the violation of the established safety procedure and notify the contractor's on-site safety supervisor;

(3) Notify his/her supervisor of the incident;

(4) Document the incident on the appropriate form for the district/division IAW paragraph I.3.A.02.03;

(5) Ensure that acceptable corrective action has been taken by the contractor before permitting work to resume; and

(6) Document both the situation and the corrective action taken in the daily report.

b. The OESS does not have the authority to:

(1) Waive safety standards; and/or

(2) Remove personnel from the job site.

I.3.A.02.02 The OESS will exercise good judgment when determining whether an observed safety violation requires formal documentation or verbal reporting to the contractor's safety officer.

I.3.A.02.03 Safety violations will be documented using HNC Form 948, or other district/division specific forms and in the daily Quality Assurance Report, as appropriate.

I.3.A.02.04 Periodically conduct reviews of on-site contractor personnel files for compliance with task order requirements regarding UXO personnel qualifications.

I.3.A.02.05 Periodically perform reviews of the contractor's on-site records to ensure that any required periodic refresher safety training and routine safety briefings have been conducted.

I.3.A.02.06 Conduct Quality Assurance surveillance activities, as required, to ensure contractor compliance with policies and regulation regarding:

a. EZ activities;

b. Work standards;

c. Intrusive activities;

d. Explosives storage and management practices;

e. Explosives Safety Submission/Chemical Safety Submission;

f. Interim Holding Facility;

g. Communications;

h. Sanitation;

i. Weather;

j. Security;

k. Equipment maintenance and use; and

l. Other issues, as requested by the PDT.

I.3.A.02.07 The OESS is responsible for providing factual information concerning the progress of a project by keeping accurate records including:

a. Daily Quality Assurance Report (QAR), as prescribed by the district/division. ***> See Appendix K***;

b. CEHNC Form 948. ***> See Appendix C***, or district/division form; and

c. CAR, as appropriate. ***> See Appendix F*.**

I.3.A.02.08 The OESS is not authorized to provide specific direction to the contractor unless designated as a Contracting Officer's Representative (COR) and as specified in the appointment memorandum.

I.3.B QA PROCEDURE FOR REMOVAL/REMEDIAL ACTIONS-INITIAL PRE-OPERATIONS CHECKS

I.3.B.01 Requirements. During the first week of operations at a project site, and when changes are made that affect paragraphs I.3.B.01.01- I.3.B.01.03, the following reviews/activities will be performed:

I.3.B.01.01 Ensure Contractor and OESS copies of the WP, SSHP, and ESS have been approved and are current (including all applicable changes/revisions).

I.3.B.01.02 Ensure contractor personnel have been approved/authorized to be on-site.

a. Does contractor have copy of contracting officer letter?

b. Spot-check status of employee medical surveillance history and HAZWOPER training.

I.3.B.01.03 Perform Magazine Inspection prior to use.

a. Do explosives magazines meet the following criteria as defined in the cited reference?

(1) Magazine sited IAW explosives siting plan? (WP/ESS)

(2) Proper Magazines (Type) being utilized (ESS)

(3) Magazine properly grounded/bonded IAW DA Pam 385-64.

(a) Visually inspect for evidence of grounding/bonding.

(b) Verify contractor documentation that grounding/bonding tests conducted and meet requirements (< 25 ohms).

(4) Lightning protection meets minimum standards and tests meet requirements IAW DA Pam 385-64.

(5) Proper fire control placards on hand, or appropriate coordination with local fire department made IAW DA Pam 385-64.

(6) Magazine physical security meets minimum standards IAW AR 190-11, AR 190-51 and or ATF Regulations.

(7) 50 Feet firebreak created around magazine IAW DA Pam 385-64.

I.3.B.02 Documentation. These reviews/activities, at a minimum, will be documented in the QAR. ***> See Appendix K***, in the "quality control inspection (QCI) Conducted" section submitted by the OESS. The QAR is distributed to the District PM, the Design Center POC, and the Chief OE Safety Group, (or the appropriate OE Design Center Safety Administrator/Lead if working for other than HNC DC). At a minimum, the following will be reported:

a. The review/activity that was conducted (in QCI Conducted section);

b. Date review conducted;

c. Name of Reviewer;

d. Title, Date and change/revision number of documents reviewed;

e. Corrective Action Taken and date action taken (if required);

f. Date corrective action completed/verified (if required).

I.3.B.03 Deficiencies Requiring Corrective Action. The following are some possible deficiencies associated with this review:

a. WP, SSHP not approved;

b. ESP/CSP/ESS/ESP not HQUSACE approved, if required;

c. WP, SSHP not current/complete;

d. ESP/CSP/ESS/CSS not current/complete;

e. Contractor personnel not authorized to be on-site;

(1) Contracting Officer letter not available.

f. Contractor Medical surveillance program and/or HAZWOPER training not being maintained;

(1) Periodic physicals not being conducted.

(2) HAZWOPER training not being maintained.

g. Magazine Inspection deficiencies include: ***> See EM 1110-1-4009 and DA PAM 385-64.***

(1) No HQUSACE approved siting plan. ***> See ER 385-1-95 and DoD 6055.09-STD.***

(2) Magazine not sited IAW the siting plan.

(3) Incorrect type of magazine used on site, the type of magazine may vary, but the actual physical security measures, lightning protection, measures will vary.

(4) If the magazine type is not the same type as documented in the ESS, assess the impact it has on:

(a) The explosives limits of items to be stored;

(b) The physical security requirements; and

(c) The lightning protection requirements.

(5) Magazine not grounded/bonded properly. ***> See Figure 11-1, EM 1110-1-4009, NFPA 780 for ATF Type II magazines.***

(6) Lightning protection system not present (if needed). ***> See EM 1110-1-4009 for a description of when lightning protection is not required.***

(7) Lightning protection system not tested properly IAW DA PAM 385-64.

(a) Visual inspection on installation and every 12 months thereafter;

(b) Electrical check on installation and every two years thereafter; and

(c) Required resistance is 25 ohms.

(8) Lightning protection system test fail, as documented.

(9) Incorrect placards on hand, or coordination not made with local fire department.

(10) Physical security inadequate, dependent upon results of physical security survey.

(11) No 50 foot fire-break around magazine.

I.3.B.04 Corrective Action. The following is the corrective action that will be taken in the event any of the deficiencies listed above are identified:

I.3.B.04.01 For I.3.B.03.a: Stop, or do not begin, intrusive work. Did contractor have approval, but simply did not have copy of KO letter on-site?

a. If YES, verify and continue work.

b. If NO, document on CEHNC Form 948 or district/division form (Quality Control) and annotate Daily QAR.

I.3.B.04.02 For I.3.B.03.b: Is change/revision critical?

a. If YES, stop work and document on CEHNC Form 948 or district/division form (Quality Control) and annotate Daily QAR.

b. If NO, continue/begin work, request contractor acquire change/revision. Annotate Daily QAR.

I.3.B.04.03 For I.3.B.03.c: Can contractor produce contracting officer letter?

a. If YES, verify and continue work.

b. If NO, Document on CEHNC Form 948 or district/division form (Quality Control). Annotate Daily QAR.

I.3.B.04.04 For I.3.B.03.d: Document on CEHNC Form 948 or district/division form (Other). Annotate Daily QAR.

I.3.B.04.05 For I.3.B.03.e. and I.3.B.03.e.(1): Do not allow explosives to be stored, do not allow intrusive operations to begin. Document on CEHNC Form 948 or district/division form (Other). Annotate Daily QAR.

I.3.B.04.06 NOTE: CEHNC Form 948 or district/division form and Daily QAR’s are records used to support official contractor evaluations and may indicate a need for the project team or the Chief of OE-S to take formal corrective action through the contracting officer should there be persistent deficiencies.

I.3.C QA PROCEDURE FOR EXPLOSIVES AND WORK PLACE SAFETY

I.3.C.01 Requirements. During on-going field operations, the contractor's explosives and work place safety practices will be verified by conducting the following reviews/activities:

I.3.C.01.01 General Work Place Safety.

a. Spot check to ensure Site Safety and Health Officer (UXOSO) is performing safety functions as defined in the approved SSHP and EM 385-1-1.

b. Spot check UXOSO documentation to verify compliance with SSHP and EM 385-1-1 and to ensure accurate reflection of safety activities being performed.

I.3.C.01.02 Explosives Safety.

a. Spot check to ensure UXOSO is performing explosives safety functions as defined in the approved WP.

b. Spot check UXOSO documentation to verify compliance with requirements of the approved WP.

I.3.C.01.03 Perform independent spot checks of work teams for compliance with the SSHP, EM 385-1-1 and appropriate explosives safety requirements.

I.3.C.02 Documentation. These activities will be documented in the QAR, in the "QCI Conducted" section submitted by the OESS. The QAR is distributed to the District PM, the Design Center POC, and the Chief OE Safety Group, (or the appropriate OE Design Center Safety Administrator/Lead if working for other than HNC DC), and the EM CX. At a minimum, the following will be reported:

I.3.C.02.01 The review/activity that was conducted (in QCI Conducted section);

I.3.C.02.02 Date activity/review conducted;

I.3.C.02.03 Name of Reviewer;

I.3.C.02.04 Title, Date and change/revision number of documents reviewed;

I.3.C.02.05 Corrective Action Taken and date action taken (if required);

I.3.C.02.06 Date corrective action completed/verified;

I.3.C.02.07 Specific reference for Safety failures noted. Example:

> *"Toilet facilities do not meet requirements of EM 385-1-1, section 2. With 15 workers, both male and female on-site, the single toilet provided cannot be locked from the inside, therefore two toilets are required, one for each sex."*

This should also be annotated on the associated CEHNC Form 948 or other appropriate form. ***> See Appendix C***.

I.3.C.03 Deficiencies Requiring Corrective Action. The following are some possible deficiencies associated with verification of explosives and general work place safety practices:

I.3.C.03.01 General Work Place Safety.

a. UXOSO is not performing required safety inspections/checks.

b. UXOSO is not accurately documenting safety inspections conducted.

I.3.C.03.02 Explosives Safety.

a. UXOSO is not performing required explosives safety inspections/checks.

b. UXOSO is not accurately documenting safety inspections conducted.

I.3.C.03.03 Work teams and/or individuals are not complying with explosives or general work safety practices.

I.3.C.04 Corrective Action. The following is the corrective action that will be taken in the event any of the deficiencies listed above are identified:

I.3.C.04.01 For I.3.C.03.01: Notify contractor PM/SUXOS to initiate corrective action. Document on CEHNC Form 948 or district/division form (Safety Comments), and Daily QAR.

I.3.C.04.02 For I.3.C.03.02: Notify contractor PM/SUXOS to initiate corrective action. Document on CEHNC Form 948 or district/division form (Safety Comments), and Daily QAR.

I.3.C.04.03 For I.3.C.03.03:

a. For all serious explosives safety violations and/or serious or life-threatening work safety violations (e.g., working in hole with improper slope, backhoe with back-up warning signal broken, worker standing under raised forklift load, etc.), Stop Work immediately. Document on CEHNC Form 948 or district/division form, or other appropriate form (Safety Violation), and Daily QAR.

b. For all other violations (not wearing work gloves, face shields, seat belts etc.), inform team/individual and appropriate supervisor. Document on CEHNC Form 948 (Safety Violation) or other appropriate form, and Daily QAR.

I.3.C.04.04 NOTE: CEHNC Form 948 or district/division form and Daily QAR's are records used to support official contractor evaluations and may indicate a need for the project team to take formal corrective action through the contracting officer should there be persistent deficiencies. Other USACE organizations may use forms specific to their organizations.

I.3.D QA PROCEDURE FOR CONTRACTOR QUALITY CONTROL

I.3.D.01 Requirements. During on-going field operations, the contractor's Quality Control process will be verified by conducting the following reviews/activities:

I.3.D.01.01 Spot check to ensure the quality control specialist (QCS) is performing quality checks of equipment maintenance checks, field operations etc., as defined in the approved QC plan. ***> See WP Chapter 11*.**

I.3.D.01.02 Spot check QCS documentation to verify compliance with QC plan and to ensure accurate reflection of QC activities being performed.

I.3.D.01.03 Spot check QCS performance of final grid QC (typically this is the contractor's 10% magnetometer check of the grid/area).

I.3.D.01.04 Spot check QCS documentation of final grid QC prior to your independent QA check.

I.3.D.01.05 Perform independent QA verification of grid/area as defined in project documents. Historically this has been a magnetometer check of at least 10% of each grid, or 10% of the total project area.

I.3.D.02 Documentation. These activities will be documented in the Daily Quality Assurance Report (QAR), in the "QCI Conducted" section submitted by the OESS. The QAR is distributed to the District PM, the Design Center POC, and the Chief OE Safety Group, (or the appropriate OE Design Center Safety Administrator/Lead if working for other than HNC DC), and the EM CX. As a minimum, the following will be reported:

I.3.D.02.01 The review/activity that was conducted (in QCI Conducted section);

I.3.D.02.02 Date review conducted;

I.3.D.02.03 Name of reviewer;

I.3.D.02.04 Title, date and change/revision number of documents reviewed;

I.3.D.02.05 Corrective action taken and date action taken (if required);

I.3.D.02.06 Date corrective action completed/verified (if required); and

I.3.D.02.07 Specific reference for QC failures noted, for example:

> *"Weekly observation of equipment maintenance not conducted by QCS as required by paragraph 11-3a of WP dated date/month/year."*

This should also be annotated on the associated CEHNC Form 948 or district/division form.

I.3.D.03 Deficiencies Requiring Corrective Action. The following are some possible deficiencies associated with verification of contractor QC activities:

I.3.D.03.01 QCS is not performing required quality inspections/checks.

I.3.D.03.02 QCS is not accurately documenting QC inspections conducted.

I.3.D.03.03 QCS is not performing final grid QC functions properly.

I.3.D.03.04 Final grid QC not documented properly before being turned over for QA check.

I.3.D.03.05 Items found during QA check.

I.3.D.03.06 Requested observations/magnetometer checks identify potential problems with geophysical data and/or the geophysical process.

I.3.D.04 Corrective Action. The following is the corrective action that will be taken in the event any of the deficiencies listed above are identified:

I.3.D.04.01 For I.3.D.03.01: Document on CEHNC Form 948 or district/division form (Quality Control) and Daily QAR.

I.3.D.04.02 For I.3.D.03.02: Notify QCS and have documentation corrected.

I.3.D.04.03 For I.3.D.03.03: Document on CEHNC Form 948 or district/division form (Quality Control) and Daily QAR.

I.3.D.04.04 For I.3.D.03.04: Notify QCS and have documentation corrected.

I.3.D.04.05 For I.3.D.03.05: Did item meet established failure criteria (for example, was it a target item IAW SOW/WP requirements?)

a. If YES, then document on CEHNC Form 948 or district/division form (Quality Control) and Daily QAR.

b. If NO, and item is MEC, then discuss finding with USACE project geophysicist and the Design Center POC to determine if project objectives need to be modified and how this may impact safety for clearance issues.

I.3.D.04.06 For I.3.D.03.06: Coordinate with USACE project geophysicist and Chief of OE-S to determine if CEHNC Form 948 or district/division form is warranted.

I.3.D.04.07 NOTE: CEHNC Form 948 or district/division form and Daily QAR's are records used to support official contractor evaluations and may indicate a need for the project team to take

formal corrective action through the contracting officer should there be persistent deficiencies.

I.3.E QA PROCEDURE FOR MAG/FLAG OR MAG/DIG OPERATIONS

I.3.E.01 Requirements. During mag/flag and mag/dig operations, the contractor's field work will be verified by conducting the following reviews/activities:

I.3.E.01.01 Spot check to ensure teams are testing equipment prior to use as defined in the geophysical investigation plan. ***> See WP*.**

I.3.E.01.02 Spot check field operations to ensure proper use of geophysical equipment, such as, "high sticking", lane width, etc. as defined in the geophysical investigation plan or by standard practices.

I.3.E.01.03 NOTE: Final QA verification of finished grids is covered in the QA Procedure for Contractor Quality Control.

I.3.E.02 Documentation. These activities will be documented in the QAR, in the "QCI Conducted" section submitted by the OESS. The QAR is distributed to the District PM, the Design Center POC, and the Chief OE Safety Group, (or the appropriate OE Design Center Safety Administrator/Lead if working for other than HNC DC), and the EM CX. At a minimum, the following will be reported:

I.3.E.02.01 The review/activity that was conducted (in QCI Conducted section);

I.3.E.02.02 Date activity/review conducted;

I.3.E.02.03 Name of reviewer;

I.3.E.02.04 Title, date and change/revision number of documents reviewed;

I.3.E.02.05 Corrective action taken and date action taken (if required);

I.3.E.02.06 Date corrective action completed/verified;

I.3.E.02.07 Specific reference for process/WP failures noted. For example:

> *"Lane width investigated is not IAW WP paragraph 5.4c. Team was using 5 feet lanes, WP requires 3 feet lanes."*

This should also be annotated on the associated CEHNC Form 948 or district/division form.

I.3.E.03 Deficiencies Requiring Corrective Action. The following are possible deficiencies associated with mag/flag and mag/dig operations:

I.3.E.03.01 Work teams are not testing geophysical equipment as required.

I.3.E.03.02 Work teams not using equipment properly.

I.3.E.03.03 Work teams geophysical process (lane width etc.) incorrect.

I.3.E.04 Corrective Action. The following is the corrective action that will be taken in the event any of the deficiencies listed above are identified:

I.3.E.04.01 For I.3.E.03.01, I.3.E.03.02 and I.3.E.03.03: Notify contractor PM to initiate corrective action. Document on CEHNC Form 948 or district/division form (WP), and Daily QAR.

I.3.E.04.02 NOTE: CEHNC Form 948 or district/division form and Daily QAR's are records used to support official contractor evaluations and may indicate a need for the project team to take

formal corrective action through the contracting officer should there be persistent deficiencies.

I.3.F QA PROCEDURE FOR DIGITAL GEOPHYSICAL MAPPING OPERATIONS. > *See EM 1110-1-4009 for detailed description of process.*

BLANK

CHAPTER I

SECTION 4

EXPLOSIVES SAFETY FOR MILITARY CONTINGENCY OPERATIONS

I.4.A GENERAL

I.4.A.01 Full compliance with other sections of this EM may not be possible during military operations other than war (MOOTW) or during contingency deployments. This section sets the minimum levels of acceptable risk for contingency deployment ammunition operations in a less than wartime environment. These provisions apply only if permitted by host nation laws and/or Status of Forces Agreements (SOFA) and authorized in writing by the ACOM, ASCC, or DRU commander.

BLANK

CHAPTER I

SECTION 5

BUILDINGS AND INSTALLED EQUIPMENT CONTAINING EXPLOSIVES RESIDUES THAT PRESENT EXPLOSION HAZARDS

I.5.A CLASSIFICATION OF THE LIKELY EVENT OF EXPLOSIVES RESIDUES PRESENCE

I.5.A.01 Depending on the type of former explosives operations, the potential for explosives residue presence in a building or its installed equipment shall be classified as “significant” or “limited”.

I.5.A.02 Significant explosives residues presence.

I.5.A.02.01 Significant presence is caused by operations that can result in extensive migration of significant amounts of explosives in the building and its installed equipment. Depending on the specific operation, such migration may be due to the release of explosives in solid, liquid, or vapor form. Explosives can migrate into inaccessible areas such as cracks, voids, behind wall and roof panels, drains, roof rafters, porous surfaces, etc.

I.5.A.02.02 In general, any operation capable of generating the release of significant quantities of explosives solids, liquids, or vapors must be assumed to result in significant explosives residues presence.

a. Solids. Operations capable of generating explosives dusts are those that result in significant migration and residuals presence. In general, any operation involving the high speed, mass handling of exposed solid explosives will produce explosives dusts. Dust can migrate and settle onto both accessible and hidden surfaces. To compound this migration, daily equipment wash downs can carry these explosives into the waste system. In contrast to explosives-dust producing operations, operations that generate

explosives chunks, slabs, etc, generally do not result in significant migration (other than possibly into wastewater drains, and sumps).

b. Liquids. In-process liquid explosives can leave significant residues inside all pipes and vessels that carry them. Daily wash-downs of equipment can carry dissolved or suspended explosives into cracks in the floor and into drains and sumps. Spills can also result in significant migration into floor cracks, drains, and sumps. For purposes of assessment, liquid explosives include explosives that are:

(1) In the liquid state at normal temperatures (e.g., nitroglycerin).

(2) Heated and melted for further processing (e.g., for loading into projectiles or blending with other explosives).

(3) Dissolved in a solvent.

(4) Suspended in a liquid carrier.

(5) Colloided. Limited to in-process propellants in liquid or paste colloid state that have not yet been dried to a solid colloid.

c. Gases. Generally, whenever an explosive that is a solid at normal temperatures is heated into a liquid (melted), some of the melted explosive volatilizes into the air. This gaseous explosive can migrate about the building and condense on any surface it comes in contact with, including hidden surfaces. After condensation, the explosive is again a solid.

I.5.A.03 Limited explosives residues presence. In contrast to significant presence, limited presence involves minor release of explosives in the immediate operating area with very little migration. Many types of operations produce only limited explosives residues presence. For example, operations involving no exposed explosives produce little, if any, explosives residues. Operations involving exposed explosives wherein there is no mass high speed handling generally do not produce more than limited presence.

I.5.A.04 Table I.5-1 on the following pages provides examples of explosives operations/buildings and classifies each example as to:

I.5.A.04.01 The phase (solid, liquid, gas) of the explosives residue(s) released when the process was in operation.

I.5.A.04.02 The extent of explosives residues (significant or limited).

Table I.5-1. Phase and Extent of Explosives Residues

Extent of Explosives Residues Presence (Significant of Limited)			
Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	**(Solid, Liquid, Gas)**	**Significant**	**Limited**
1. Amatol manufacture	Solid (spills of explosive in the cooling/pelletizing/flaking area)		X
	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted TNT) (see note 3)	X	
2. Ammonium nitrate manufacture	Solids (generated during handling and packing of dried crystals)		X
	Liquids vessels/piping/evaporators/ prilling towers used in actual manufacture, which involves ammonium nitrate in solution in water; wash down water; wastewater)	X	
3. Booster pellet pressing, high speed, high volume, automated	Solids (dusts)	X	
	Liquids (wash down water)	X	
4. Bullet impact testing	Solids (chunks)		X
5. Cast loading	Solid (dust particles generated during crushing of sprues for remelting, or tamping pelletizing explosive onto top of casting)	X	
	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted explosive)	X	
6. Change houses	Solid		X
7. Chipping	See pelletizing		
8. Closing plug installation or removal	Solid		X
9. Composition B manufacture	Solid (spills of explosive in the cooling/pelletizing/flaking area)		X
	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted TNT) (see note 3)	X	
10. Contained detonation chamber	Solid (small amounts of undetonated explosive)		X
11. Contaminated waste processing (a type of thermal treatment)	Solid (unburned explosive; presence of more than trace amounts unlikely)		X

Table I.5-1. Phase and Extent of Explosives Residues (continued)

Extent of Explosives Residues Presence (Significant of Limited)			
Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	**(Solid, Liquid, Gas)**	**Significant**	**Limited**
12. Cutting, high speed, high volume	Solid (small chunks not caught by coolant)		X
	Liquid (wash water, coolant recovery/reconditioning system)	X	
13. Cyclotol manufacture	Solid (spills of explosive in the cooling/pelletizing/flaking area)		X
	Liquids (wash down water, spills of melted explosive)	X	
14. Depriming cartridge cases, press fit primers, high speed, high volume, automated	Solid (dusts)	X	
15. Depriming cartridge cases, press fit primers, low speed, low volume, automated or manual	Solid (loose primers, small particles)		X
16. Depriming cartridge cases, threaded primers	Solid (small particles)		X
17. Detonator press loading, high speed, high volume, automated	Solid (dusts)	X	
	Liquid (wash down water)	X	
18. Drilling explosives, low speed, automated, not liquid cooled (applicable to milling)	Solid (small particles)		X
	Liquid (wash down water)		X
19. Drilling explosives, liquid cooled	Solid (small chunks not caught by coolant)		X
	Liquid (coolant recovery/reconditioning system, wash down water)	X	
20. Explosive D manufacture	Liquid (in picric acid/ammonia reaction vessels and piping; spills; wash-down water; wastewater)	X	
21. Explosive waste incineration (a type of thermal treatment)	Solid (residual unburned explosive)		X
22. Explosives or explosives dust vacuum collection	Solid (dusts)	X	
23. Extrusion, propellant grains and demolition charges, high speed, high volume	Solid (chunks and particles)		X
	Liquid (wash down water)	X	
24. Firing hardstands for missiles, guns, etc.	Solid (small particulates)		X
25. First fire composition manufacture	See pyrotechnic mixing		

Table I.5-1. Phase and Extent of Explosives Residues (continued)

Extent of Explosives Residues Presence (Significant of Limited)			
Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	**(Solid, Liquid, Gas)**	**Significant**	**Limited**
26. Flaking	See pelletizing		
27. Flare mix manufacture	See pyrotechnic mixing		
28. Flashing (a type of thermal treatment)	Solid (unburned explosive)		X
29. Fuze installation or removal	Solid (release of explosives very unlikely)		X
30. Fuze liner removal	Solid (chunks of explosive adhere to fuze liner exterior and can fall off on floor)		X
31. Gaging ammunition	Solid (release of explosive very unlikely)		X
32. HBX manufacture	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted TNT) (see Note 3)	X	
33. HMX manufacture	Liquid (HMX is dissolved in solvents at certain stages of manufacture)	X	
34. Hot gas decontamination	Solid (small particles of explosive that fell off the items to be treated may remain in the hot gas chamber)		X
35. Ignition mix manufacture	See pyrotechnic mixing		
36. Incendiary mix manufacture	See pyrotechnic mixing		
37. Incineration	Solid (small amounts of unburned explosive may remain in the incinerator)		X
38. Inspection (e.g. surveillance workshops, “K” lines)	Solid (small amounts of explosive may have been spilled during inspection)		X
39. Lathe turning, low speed, not liquid cooled	Solid (dusts, small chunks)		X
	Liquid (wash-down water)	X	
40. Lathe turning, liquid cooled	Solid (small particles that are not captured by coolant)		X
	Liquid (wash-down water, coolant recovery/reconditioning system)	X	
41. Laundering facilities for explosives workers’ coveralls[2]	Solid (small particles dropped from clothing prior to washing)		X
	Liquid (laundry wash water)		X

Table I.5-1. Phase and Extent of Explosives Residues (continued)

Extent of Explosives Residues Presence (Significant of Limited)			
Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	**(Solid, Liquid, Gas)**	**Significant**	**Limited**
42. LCL (less than car-load) building	Solid (minor spills)		X
43. Lifting plug installation or removal	Solid (very small particulates at most)		X
44. Linking or de-linking ammunition	Solid (release of any explosive not likely)		X
45. Loading dock	Solid (small possibility of minor spills due to accidentally punctured containers of ammunition or bulk explosives)		X
46. LTL (less than truck load) Building	Solid (minor spills)		X
47. Melt out of explosives from projectiles or bombs	Solid (spills of explosive in the cooling/ pelletizing/flaking area)		X
	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted explosive)	X	
48. Melt-pour of explosives into projectiles, warheads, bombs, etc	See Cast loading		
49. Missile final assembly/disassembly (does not include assembly/disassembly of explosives components)	Solid		X
50. Missile maintenance	Solid		X
51. Nitrocellulose manufacture	Liquid (in nitrating vessels, in wringers and dryers, equipment wash-down water, wastewater)	X	
52. Nitroglycerine manufacture	Liquid (in nitrating vessels, separators, washers, settling tanks, nitroglycerin storage tanks, equipment wash-down water, wastewater)	X	
53. Octol manufacture	Solid (spills of explosive in the cooling/ pelletizing/flaking area)		X
	Liquids (wash down Water)	X	
	Gas (from melted explosive)	X	
54. Pack/unpack bay in a maintenance or production building	Solids		X
55. Packaging and shipping	Solids		X
56. Painting or marking ammunition or packaging	Solids (no release likely)		X

Table I.5-1. Phase and Extent of Explosives Residues (continued)

Extent of Explosives Residues Presence (Significant of Limited)			
Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	**(Solid, Liquid, Gas)**	**Significant**	**Limited**
57. Pelletizing	Solids (no release likely)		X
58. Pelletizing	Solids		X
	Liquids (wash down water, spills from melted explosive)		X
	Gas (from melted explosive)	X	
59. Personnel shelters	Solids (no release likely)		X
60. Photoflash powder manufacture	See Pyrotechnic Mixing		
62. Popping Plant (a type of thermal treatment)	Solid (unburned explosive)		X
63. Pressing , low speed, automated or manual (normally used in the press loading larger items, such as projectiles and warheads)	Solid		X
64. Pressing, high speed, high volume, automated (normally used in the pressing of smaller items, such as detonators and small shaped charges)	Solid (dusts)	X	
	Liquid (wash down water)	X	
65. Primer loading, high speed, high volume, automated	Solid (dusts)	X	
	Liquid (wash down water)	X	
66. Primer mix manufacture	See Pyrotechnics	X	
Priming cartridge cases	Solid		X
67. Projectile base plate assembly or removal	Solid		X
68. Projectile crimping	Solid		X
69. Projectile fin assembly or removal	Solid		X
70. Projectile main charge pressing	Solid		X
71. Projectile ogive assembly or removal	Solid		X
72. Projectile pull-apart (from cartridge case)	Solid		X
73. Projectile rotating band or obturator assembly or removal	Solid		X
74. Projectile seating	Solid		X

Table I.5-1. Phase and Extent of Explosives Residues (continued)

Extent of Explosives Residues Presence (Significant of Limited)			
Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	**(Solid, Liquid, Gas)**	**Significant**	**Limited**
75. Projectile tracer assembly to bullet, tracer element has no metal body [typical for small caliber ammunition (.50 cal and smaller)]	Solid (dusts)	X	
76. Projectile tracer assembly to or removal from projectiles, tracer elements have metal bodies [typical for medium and large caliber (20mm and larger)]	Solid (small particles)		X
77. Propellant collection, in containers, high speed, high volume	Solid (dusts) (normally captured in a vacuum collection system)	X	
	Liquid (in wash down water)	X	
78. Propellant collection, in containers, low speed (usually manually dumped), low speed, low volume	Solid (individual grains of propellant)		X
79. Propellant collection, using vacuum collection system	Solid (dusts)	X	
80. Propellant loading or removal, bagged propellant	Solid (individual grains)		X
81. Propellant loading or removal, unbagged (loose) propellant, high speed, high volume	Solid (dusts) (normally captured in a vacuum collection system)	X	
	Liquid (wash down water)	X	
82. Propellant loading or removal, unbagged (loose) propellant, low speed, low volume	Solid (individual grains)		X
83. Propellant manufacture – single, double, or triple base	Solid (small chunks released at extrusion and cutting operations)		X
	Liquid [solvent/propellant mixing equipment, waste water, equipment wash-down water, nitroglycerin tankage and supply lines (double and triple base only)]	X	
84. Propellant or propellant dust vacuum collection	Solid (dusts)	X	
85. Pyrotechnic ingredient mixing, dry	Solid (dusts)	X	
	Liquid (wash-downs)	X	
86. Pyrotechnic ingredient mixing, wet	Liquid (in mixing vessels and associated piping, from spills during wet mixing, from wash-downs)	X	

Table I.5-1. Phase and Extent of Explosives Residues (continued)

Extent of Explosives Residues Presence (Significant of Limited)			
Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	**(Solid, Liquid, Gas)**	**Significant**	**Limited**
87. RDX manufacture	Solid (in drying rooms or equipment)	X	
	Liquid (in nitration vessels and piping, from spills, wash-down water, wastewater)	X	
88. Rotary kiln furnace (a type of thermal treatment)	Solid		X
89. Shaker testing	Solid		X
90. Signal mix manufacture	See Pyrotechnics		
91. Starter mix manufacture	See Pyrotechnics		
92. Static test stand for warheads, projectiles, etc	Solid		X
93. Steam out of explosives from projectiles or bombs	See Melt Out	X	
94. Storage (e.g., earth covered magazines, aboveground magazines, covered storage pads, service magazines)	Solid (low possibility of traces of spilled explosives)		X
95. Supplementary charge insertion or removal	Solid (small particles)		X
96. Temperature conditioning units or magazines	Solid		X
97. Temporary storage bay in a maintenance or production building	Solid		X
98. Tetryl manufacture	Solid (in drying rooms or equipment)		X
	Liquid (inside all reaction vessels and piping serving them; from wash down water and process waste water)	X	
99. Tetrytol manufacture	Solids (in drying rooms or equipment)		X
	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted TNT and tetryl)	X	

Table I.5-1. Phase and Extent of Explosives Residues (continued)

Type of Ammunition or Explosives Operation or Facility Phase of Explosive Released	(Solid, Liquid, Gas)	Extent of Explosives Residues Presence (Significant of Limited) Significant	Limited
100. TNT manufacture	Solid (flaking operation)		X
	Liquid (nitrating vessels and associated piping, molten TNT purification vessels, wash down water; waste water	X	
	Gas (explosive effluent tetranitromethane emitted at trinitration step; TNT vapors from molten TNT purification vapors	X	
102. Torpex manufacture	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted TNT) (see Note 3)	X	
103. Tracer mix manufacture	See Pyrotechnics		
104. Tritonal manufacture	Liquids (wash down water, spills of melted explosive)	X	
	Gas (from melted TNT) (see Note 3)	X	
105. Vacuum collection system for propellant or explosives	See Propellant Vacuum Collection		
106. Vibration testing			X
107. Wash out of explosives from projectiles or bombs	See Melt-out		

Notes to Table I.5-1:
1. EXCEPTION: changing houses used by workers exposed to high amounts of explosives dusts or gases may contain significant residual explosives in the shower drains.
2. EXCEPTION: laundering facilities that laundered coveralls used by explosives workers exposed to significant quantities of explosives dusts or gases may have significant residual explosives in the washing equipment, drains, sewers, and sumps.
3. Such TNT vapor occurs during the manufacture of “composite” explosives formed by melting TNT, then mixing in the other explosive(s), which remain in solid form. These additive explosives are normally ground to small particle sizes, then mixed with the molten TNT. They have higher melting temperatures than TNT. Some explosives, such as tritonal, are mixtures of TNT and a metal powder, such as aluminum. The aluminum, like explosives that are added to the molten TNT, does not melt either. Since the additive

explosives or metals do not melt, they do not produce gaseous explosives vapors. Only TNT vapors are produced.

I.5.B INSPECTION AND TESTING FOR EXPLOSIVES RESIDUES

I.5.B.01 Visual inspection, supplemented by colorimetric tests, can conservatively determine the presence of explosives hazards. Visual inspection, in this interim guidance, means inspection with the naked eye.

I.5.B.02 General rules.

I.5.B.02.01 All surfaces where explosives residues are suspected to have been deposited must be visually inspected. The scope of this inspection – that is, the number of surfaces – depends on whether there is a significant versus a limited presence of explosives. ***> See paragraphs I.5.A.02 & I.5.A.03***. In any event, if a surface that is suspected to contain residues cannot be inspected, assume there are explosive hazards.

I.5.B.02.02 If explosives can be seen on a surface, assume there are explosives hazards.

I.5.B.02.03 If no explosive or suspect material can be seen on a surface, there are no explosives hazards.

I.5.B.02.04 If unidentifiable foreign material can be seen on a surface, perform either a colorimetric field test or a flame test.

a. Colorimetric field test. “EXPRAY” is a readily available commercial colorimetric test kit and is in wide use. EXPRAY can detect a very wide range of explosives compounds. If an EXPRAY test is positive, assume there are explosives hazards. Note: EXPRAY can detect extremely small amounts of explosive and will therefore give a very safety-conservative “positive” reading in many cases where the concentrations of explosives are very small. Therefore, positive results obtained from an “EXPRAY” test do not necessarily indicate an explosive hazard exists. One can

conservatively assume that it does, or one can perform a flame test.

b. Flame test. It is also permissible to test a small sample of unidentifiable material for its reaction to flame. Using non-sparking tools, collect a sample of the material no larger than a pinhead. Locate the sample in an area away from any areas known or suspected to contain explosives. Place the sample on a clean, dry, non-flammable surface, such as a steel plate. Although the test quantity is so small it will not expose test personnel to explosive hazards, leather gloves, full face protection, and ear protection are recommended. The operator will expose the sample to flame, such as a portable blowtorch. It is best to perform this test at least 10 times. An energetic reaction (rapid burning or a “pop”) during any test indicates that explosive hazards exist.

I.5.B.03 Specific rules for buildings, equipment and operations with LIMITED explosives residues presence.

I.5.B.03.01 Visually inspect/test accessible surfaces IAW the general rules in paragraph I.5.B.02.

I.5.B.03.02 It is not necessary to visually inspect inaccessible surfaces. Explosives migration into these areas is very unlikely.

I.5.B.04 Specific rules for buildings, equipment and operations with SIGNIFICANT explosives residues presence.

I.5.B.04.01 Visually inspect/test accessible surfaces IAW the general rules in paragraph I.5.B.02.

I.5.B.04.02 Inaccessible surfaces can be accessed for inspection/test by disassembly. Care must be taken when disassembling equipment with known or suspected explosives residues. All threaded connections, flanges, mating surfaces, etc, should be soaked with penetrating oil and allowed to sit for 24 hours before disassembly. Pipes and tanks with known or suspected explosives residues can be filled with water before disassembly. Disassembly can be performed manually, or with

remotely controlled power equipment. Manual disassembly poses greater hazards to operators: do not use chisels, saws, or drills; do not loosen threaded connections by using cheater bars on wrenches; do not pound equipment with hammers; and do not hammer wedges into mating surfaces to separate them. If manual disassembly is not selected, then powered disassembly (saws, shaped charges, shears, etc) can be done, but it must be must be done remotely if explosives are present or the absence of explosives cannot be verified. To determine the separation distance from remotely controlled disassembly operations, contact the MM CX.

I.5.B.04.03 Inaccessible surfaces that cannot be disassembled can sometimes be inspected by specialized equipment (such as borescope pipe inspection “snakes”). Examples are the interiors of piping, vessels, and other inaccessible surfaces. However, such equipment normally lacks the discrimination of the human eye and is often unable to render an image that allows personnel to determine whether the surface is merely discolored, or whether there is material (explosive or otherwise) on the surface. If any foreign material is seen, assume it presents explosive hazards unless a sample can be remotely collected for colorimetric or flame test. ***> See paragraph I.5.B.02*.**

I.5.B.04.04 Inaccessible surfaces that are not disassembled or remotely inspected/tested shall be considered to contain explosives residues presenting explosive hazards. In place of disassembly, it is often most effective to simply assume the inaccessible surfaces contain significant explosives residues, and burn the building as described in paragraph I.5.C.01.01.

I.5.B.04.05 Cracks. Cracks may hide contamination. Cracks often occur in welds or joints, but can occur in other areas as well. Experience has shown the amount of explosive contaminant in cracks is insufficient to create a hazard where the outside surfaces are confirmed clean, the material is nonporous, and the material is no more than 1/8-inch thick. Assume all nonporous materials over 1/8-inch thick have cracks, unless a detailed visual inspection proves otherwise.

I.5.B.04.06 Porous surfaces. Porous generally refers to building materials, such as wood, gypsum board, etc., and paper products, like cardboard. Porous materials are not resistant to absorption of liquid or vapor explosives. Porous materials may absorb some explosives and render them undetectable to the naked eye. Nonporous refers to metal, glass or other materials with hard, smooth, and resistant surfaces. Porous material containing an absorbed explosive may leave no visible trace or signature that it is contaminated. If evidence of a liquid or vapor contaminant is present, you must assume the contaminant penetrates the porous material surface, and physical cleaning will not decontaminate the material. Ammunition and explosives buildings and installed equipment are primarily made of four materials: metal, wood, concrete, and transite. Under certain conditions, some of these materials may absorb explosives. ***> See Table I.5-2.***

Table I.5-2. Absorption of Explosives as a Function of Type of Material and Phase of Explosive

Type of Material[1]	Phase of Explosive		
	Solid[2]	Liquid[3]	Vapor[4]
Wood	Non-absorptive	Absorptive	Absorptive[6]
Metal (except cast iron)	Non-absorptive	Non-absorptive[8]	Non-absorptive
Cast iron	Non-absorptive	Non-absorptive[7]	Non-absorptive[7]
Concrete	Non-absorptive	Non-absorptive[7]	Non-absorptive[7]
Transite	NA[5]	NA[5]	Non-absorptive

Notes for Table I.5-2:

1. Assumes material contains no cracks. Cracks are addressed in paragraph I.5.B.03.05.
2. Includes not only chunks, slabs, etc, but also explosives dusts. Explosives dusts are NOT vapors. Dusts are composed of individual particles of explosive in the air. Each particle consists of many (millions) of molecules of the explosive. Vapors consist of individual molecules of the explosive in the gaseous state.
3. Includes explosives that are liquids at normal temperatures (e.g., nitroglycerine), explosives that are liquids at elevated temperatures (e.g., TNT, white phosphorous), and explosives that are dissolved in solvents (e.g., flare mix dissolved in hexane during a mixing operation).
4. Vapor phase explosives are found where explosives are melted to pour them into shell or bomb bodies. They are also found where explosives are washed, steamed, or melted out of shell or bomb bodies.

5. Transite, an extremely fire-resistant material, was used for roof shingles and sometimes for the exterior siding of ammunition and explosives buildings. Solid or liquid explosives contact with transite is therefore an unlikely scenario.
6. Of particular concern is wood in proximity to any explosives manufacturing operation involving nitration or nitric acid. This wood can itself become be partially nitrated so as to form low-grade cellulose nitrate, a flammable solid.
7. Small amounts of liquid or vapor explosive can migrate into concrete and cast iron, but not in sufficient quantities to present explosion hazards.
8. Explosives can reside below the rust and scale inside of pipes and tanks.

I.5.B.04.07 Drains, waste disposal systems, and slabs. In addition to explosives residues in the building and its installed equipment, drains and waste disposal systems (e.g. industrial and sanitary sewers, acid reconstitution lines) must also be assumed to present explosion hazards. The concrete slabs and soil underneath the building may also contain significant amounts of explosives residues in cases where there are cracks in the slab or leaks in the floor drains and explosives residues have been deposited over the years from water wash-downs of explosives contaminated equipment.

I.5.C REMOVAL OF EXPLOSIVES RESIDUES

I.5.C.01 Buildings and installed equipment with SIGNIFICANT explosives residues presence. ***> See Table I.5-1.***

I.5.C.01.01 In terms of effectiveness, cost, implementation, and explosives safety, burning a building in place is the preferred method to remove explosive hazards from explosively contaminated buildings and installed equipment. The normal procedure is to heat the article or piece of equipment to a level above the decomposition temperature of the explosive and hold it there long enough to ensure the largest mass is at that temperature, consuming the explosive. Dunnage and combustible material (wooden pallets are often used) will be added to the buildings to augment the temperatures within the building. This is sufficient to bring the building and equipment up to and over the temperature at which explosives will decompose, burn, or detonate (any or all reactions are possible, but the result is the same: the explosives are gone). The vast majority of explosives will decompose, detonate, or burn when exposed to temperatures of

900 degrees Fahrenheit for 5 seconds. There are a few exceptions; H6 and HEX-48 require 1100 degrees for five seconds. Regardless, experience has shown that a sustained, vigorous engulfing burn for at least 1/2 hour will ensure all building and equipment will reach these temperatures.

I.5.C.01.02 Although many explosives will merely burn when the building is burned, some explosives residues, particularly those located in confined locations (process vessels, piping) can detonate during the burn. The inspections done in Section I.5.B will ideally allow an estimate of the maximum credible event (MCE), in pounds of explosive. The MCE then establishes the minimum separation distance (MSD) in feet for personnel during the burn (contact the Huntsville EM CX for minimum separation distances). If such an estimate cannot be made, then experience has shown that a very safety conservative default maximum credible event for these accidental detonations is 100 lbs. Based on a possible detonation of a 100 lb MCE, a minimum separation distance of 1250 feet will be established during the burn to protect personnel.

I.5.C.01.03 Detonations during the burn can expel process equipment from the building that will require inspection and likely require re-flashing. To reduce the number of detonations during the burn, vent explosives-laden vessels and piping and any equipment (e.g., motors, dust collectors) capable of pressure containment to minimize the probability of accidental detonation during burning.

a. Remote cutting using linear shaped charges is generally the safest and most efficient method for disassembly, inspection, and venting. All personnel shall be 1250 feet away during shaped charge venting. In cases where pipes and vessels are suspected to contain large amounts of explosive, they should be removed from the buildings and taken to a remote location for venting. Perforators and detonating cord will be used to flash the accumulated explosives and also gain access to any areas of piping or equipment that are not readily available for visual inspection. After the venting, they should be returned to the building for the burn. This process is recommended to avoid a

large accidental detonation inside the building during burn operations. Such an accidental explosion could complicate subsequent demolition operations.

b. If use of explosives is not permitted (such as in sensitive Department of Energy plants with radiological hazards), approved alternate methods of disassembly are acceptable. Prior to disassembly, flood vessels and pipes with water and apply large amounts of penetrating oil over a period of 24 hours. Do not manually (by hand) disassemble flanged, welded, or threaded connections. Remote saws can be used provided the exterior of the pipe/item is continually sprayed with water or other coolant during cutting. Water jet cutters can also be used to cut, disassemble, and wash pipes and equipment. All personnel shall withdraw to a distance of 1250 feet during disassembly operations.

I.5.C.01.04 Although the “1/2 hour” rule of thumb has proven effective, it is suggested the effectiveness of the burn should be verified. Measuring burn temperatures, and the period of time this temperature was maintained, is an important aspect of the explosive decontamination process. In particular, extensive initial temperature monitoring of the first buildings burnt at a project site provides data to indicate what amount of wood is necessary for subsequent burns in other buildings. The primary method used to monitor and verify that the structures, equipment and process piping have been decontaminated is by verifying that these features achieved a temperature at which the explosives of concern decompose, burn, or detonate. Temperature verification can be conducted using several reputable methods. They can be used in combination.

a. Temperature sensitive crayons (such as OMEGASTICK®), pellets (such as OMEGAPELLET®) or lacquers (such as OMEGALAQ®) are placed inside piping and equipment, and at several locations throughout the buildings being thermally decontaminated. Select crayons, pellets, or paints that undergo their intended change at 900°F.

(1) Crayons and pellets melt at the target temperature. Their melting and re-solidification in a new shape, or their disappearance, is proof that the melting point has been reached.

(2) Lacquers, when initially applied, dry to a dull opaque mark. When the target temperature is reached, the material melts and upon cooling solidifies to a glossy-transparent appearance. If a temperature significantly above the target is achieved or the target temperature is held for an extended period, the paint may char.

b. Real-time temperature monitoring can also be conducted at select locations within the buildings and equipment during the burns. Thermocouples can be placed in areas of the buildings that are of greatest concern (and that are also most insulated by surrounding equipment or building structural features) to document that the required decontamination temperatures were achieved. Data loggers (such as multi-measurement System MMS-3000-T6V4) and thermocouples provide continuous real-time monitoring of the burns. The thermocouple wires are protected from the heat as they will degrade at the burn temperatures and the data logger must be placed outside of the building in a location protected from the heat.

c. Certipaks can also verify that the requisite temperature is attained. Certipaks can be prepared by dissolving two grams of the type of explosive at the site (explosive can be recovered from the site if available) in 10 ml of acetone. Porcelain boiling chips are immersed in the solution and allowed to sit for ten minutes. The chips are then removed and allowed to air dry on a square of aluminum foil. Once dry, six of the beads/chips are randomly selected. Three are tested for the presence of detectable levels of explosives using Expray. Once it is confirmed that the contamination can be detected, three to five beads/chips are wrapped in aluminum foil packages (stainless steel or galvanized sheet steel can also be used) and placed in clean one-quart paint cans for placement in and around the building and equipment. Following flashing of the buildings, the cans are recovered, unless they melt (if they are melted, 900 degrees has been obtained and it is unnecessary to recover and test the beads). The recoverable

beads in the foil are then tested for the presence of explosives using Expray.

d. Post-burn inspection and testing can be performed as a final check. UXO-qualified personnel can inspect and test selected surfaces using EXPRAY. Selection is based on judgment of on-site personnel. ***> See paragraph I.I.5.D for responsibilities in management of the disposition of building debris and scrap.***

I.5.C.01.05 If a building and its installed equipment cannot be burned in place, then a much more time-consuming, expensive, and most importantly - riskier process of engineered disassembly and explosives removal must be followed. From an explosives safety standpoint, this process is not recommended unless permits cannot be obtained to burn the buildings. Operators face greatly increased risk when disassembling equipment containing significant explosives residues. The disassembly operations required are far more extensive than the disassembly and venting operations required prior to simply prepare a building for burning.

a. If installed equipment must be manually disassembled for inspection and decontamination, then the same procedures as described in paragraph I.5.C.01.03 apply (for example, remote cutting using linear shaped charges, saws, shears, etc.)

b. It is recommended that components of the building and installed equipment be reduced sufficiently in size to allow their treatment in conventional hazardous waste incinerators, heating ovens, or in hot gas decontamination units. At some sites, regulators have permitted the open-air burning of disassociated equipment.

c. In lieu of the thermal treatment just discussed, conventional cleaning (such as pressure washing, steam cleaning, brushing, scraping) or chemical neutralization may be employed.

d. Once the contaminated equipment is addressed, the building itself must be addressed. Inspect all building surfaces for explosives, and remove as much explosives as possible from walls,

ceilings, rafters, etc. via steam cleaning or other methods. The walls will be inspected for wall penetrations, hollow block construction, openings and cracks and crevices. Any noticeable cracks in the hollow walls will require that the crack be flooded with water within three feet on either side of the cracked area. Alternatively, explosives accumulated is hollow walls can be vented by using donor charges. Conventional demolition equipment can then be used to raze the building. If there is the possibility of explosives residues in inaccessible building structural components or cracks, then the equipment operator should be provided shielding.

I.5.C.01.06 Building slabs. Large amounts of explosives can accumulate beneath building slabs under certain conditions. If equipment with significant contamination was subjected to periodic wash downs when the equipment was operational, explosive-laden wash water can migrate through cracks in the slab and accumulate beneath it.

a. The burning procedures described in paragraph I.5.C.01.01 to I.5.C.01.04 will not necessarily remove these explosives accumulations. There are several alternatives, depending upon whether the explosives are of the “primary” or “secondary” variety.

(1) Primary explosives. These are highly sensitive initiating explosives used in primers and detonators. They include lead azide, lead styphnate, mercury fulminate, and DDNP. Dry, undecomposed nitrocellulose, and nitroglycerin, although not technically primary explosives, should be considered as such for the purposes of this subparagraph. Do not lift slabs when significant presence of these explosives beneath slabs is known or suspected. Attempt to confirm the absence of these explosives by remotely drilling through the slab into the soil beneath. The building usage and classification, slab configuration and the soil geology will determine the number and locations of drilling samples. Maintain a minimum separation distance of 1250 feet during drilling. Fill drill holes with water to desensitize sample material and take samples for field test and/or laboratory analysis. If results are confirmed negative, lift slabs using conventional equipment (e.g., backhoes).

If the results are positive or if primary explosives are suspected to be present, do not lift the slabs. The only safe treatment option is to lay large linear shaped charges over the cracks, and detonate them in order to detonate the primary explosives. Maintain a minimum withdrawal distance of 2500 feet during detonation. The slab can then be lifted using hardened equipment. The drilling and lab analysis step can be skipped, and the project can proceed directly to the use of linear shaped charges if this is more cost effective.

(2) Secondary explosives. These explosives are much less sensitive than primary explosives. Examples include TNT; Compositions A, B, and C; Explosive D; octol, etc. Nitroguanodine, although not technically a secondary explosive, should be considered such for the purpose of this subparagraph. Slabs may be lifted when secondary explosives are known or suspected to exist in slab cracks or underneath slabs. However, pinch points may be created at existing cracks when a slab is lifted. Before lifting, thoroughly soak all cracks with water (or better yet, oil).

I.5.C.02 Buildings and installed equipment with LIMITED explosives residues presence. ***> See Table I.5-1*.**

I.5.C.02.01 Any explosives presence in these buildings will not be capable of migration into hidden surfaces and can be readily detected by visual examination of all readily accessible areas. Any explosives (or, in some cases, ammunition) found can be manually removed.

I.5.C.02.02 After visual inspection and removal of any residual explosives, such buildings and their installed equipment can be considered to present no explosive hazards.

I.5.D MANAGEMENT OF SCRAP AND BUILDING DEBRIS AFTER THE REMOVAL

I.5.D.01 Buildings with only limited explosives residuals are still intact after any residual explosives are removed from them. Very little, if any, building or equipment debris is generated during

removal. These buildings are often are not razed with Army funding unless they have structural weaknesses posing safety hazards.

I.5.D.02 However, buildings and equipment with significant explosives residues presence are normally destroyed by the process of removing the residuals, and significant amounts of building and equipment debris are generated. For these, building debris and process equipment must be disposed in a landfill or recycled.

I.5.D.02.01 Prior to transfer from DoD control, this material must be inspected (and verified and certified) as presenting no explosive hazards. For building and equipment debris generated from “burn in place”, the “two 100 percent inspection” rule used for UXO removals does not apply since a very rigorous removal process (high temperature) has already been applied.

I.5.D.02.02 Rather than 100 percent inspections, the contractor will, after the burn, check temperature sensitive crayons, certipaks, etc. to insure target temperatures have been reached, and then, using expert judgment, inspect and EXPRAY-test selected items of building and equipment debris.

I.5.D.03 The contractor will:

I.5.D.03.01 Ensure the specific procedures and responsibilities for processing building and equipment debris for certification as scrap metal are being followed, performed safely, consistent with applicable regulations, and IAW the USACE-approved project WP and site safety and health plan.

I.5.D.03.02 Be responsible for ensuring that the Work and QC Plans specify the procedures and responsibilities for processing building and equipment debris for the final disposition as waste or scrap metal.

I.5.D.03.03 Ensure a Requisition and Turn-in Document, DD Form 1348-1A (or equivalent) is completed for all building and equipment debris to be transferred for final disposition.

I.5.D.03.04 Perform random checks to satisfy that the building and/or equipment debris is free from explosive hazards.

I.5.D.03.05 Certify and verify building and equipment debris as free of explosive hazards.

a. The contractor will ensure that building and equipment debris is properly inspected IAW the procedures above. Only personnel who are qualified per USACE policy will perform these inspections. Project personnel that are qualified per USACE policy will certify and verify the debris as presenting no explosive hazards.

b. DD form 1348-1A (or equivalent) will be used as certification/verification documentation. All DD forms 1348-1A (or equivalent) must clearly show the typed or printed names of the certifier and verifier, organization, signature, and contractor's home office and field office phone number(s) of the persons certifying and verifying the scrap metal.

c. Local directives and agreements may supplement these procedures. Coordination with the local concerns will identify any desired or requested supplementation to these procedures.

d. In addition to the data elements required and any locally agreed to directives, the DD form 1348-1A (or equivalent) must clearly indicate the following for building and equipment debris:

(1) Basic material content (Type of material; e.g., concrete, wood, mixed construction materials, metal);

(2) Estimated weight;

(3) Load number; and

(4) Location where building/equipment debris was obtained.

I.5.D.04 Enter the following certification/verification statement on each DD 1348-1A (or equivalent) for turn over of building/equipment debris. Both the certifier and verifier will sign.

> *"This certifies that the material listed has been 100 percent properly inspected and, to the best of our knowledge and belief, is free of explosive hazards."*

I.5.D.05 Be responsible for ensuring that these inspected materials are secured in a closed, labeled and sealed container. In cases where the size of building debris or installed equipment may not permit its containerization, the contractor will ensure such materials are kept in a segregated area and take measures to prevent unauthorized entry.

I.5.D.06 The contractor can transfer to the general public articles, pieces of equipment, or building debris verified and certified as presenting no explosive hazards. These items are safe for welding, sawing, or other heat-generating processes.

I.5.D.07 For Articles, pieces of equipment, or building debris known or suspected to contain explosives hazards the contractor should only transfer such to knowledgeable Government installations or qualified buyers possessing a BATF explosive manufacturer's license. However, such material can be sold to organizations or individuals who are not Government entities and do not possess a BATF license (usually metal recycling facilities or smelters) if:

I.5.D.07.01 They have the proper facilities and detailed knowledge to safely store, handle, and, if necessary, disassemble items known or suspected to present explosives hazards.

I.5.D.07.02 They agree they will process the material to remove explosive hazards.

I.5.D.07.03 They agree to provide an end-use certificate or recycling certificate.

I.5.D.07.04 They successfully pass a Government safety audit or pre-award survey (or the equivalent by the responsible entity or agency) verifying satisfaction of paragraph I.5.D.03, above.

I.5.D.08 For containerized materials, ensure inspected materials are documented as follows:

I.5.D.08.01 The first container will be closed and clearly labeled on the outside with a unique identification that will utilize the following format and continue sequentially:

USACE/Installation Name/Contractor's Name/Container No. 0001/Seal's unique identification

I.5.D.08.02 The container will be closed in such a manner that a seal must be broken in order to open the container. A seal will bear the same unique identification as the container or the container will be clearly marked with the seal's identification if different than the container.

I.5.D.08.03 A documented description of the container will be provided by the contractor with the following information for each container: contents, weight of container, location where building or equipment debris was obtained, name of contractor, names of certifying and verifying individuals, unique container identification, and seal identification, if required. These documents will also be provided by the contractor in a separate section of the final report.

I.5.D.09 For non-containerized materials (such are removed from the site by the truckload), ensure inspected materials are documented as follows:

I.5.D.09.01 A hard copy paper will be provided to the shipper containing the following information: The first load will be labeled with a unique identification that will utilize the following format and continue sequentially:

USACE/Installation Name/Contractor's Name/Load No. 0001

I.5.D.09.02 A documented description of the load will be provided by the shipper with the following information for each load: contents, weight of load, location where building or equipment debris was obtained, name of contractor, names of certifying and verifying individuals, and load number. These documents will also be provided by the contractor in a separate section of the final report.

I.5.D.10 Maintain the chain of custody and final disposition. The contractor, in coordination with the Corps of Engineers, will arrange for maintaining the chain of custody and final disposition of the certified and verified material. The certified and verified material will only be released to a shipper that will:

I.5.D.10.01 Upon receiving the material in the truckload, each with its own load number, after reviewing and concurring with all the provided supporting documentation, sign as having received and agreeing with the provided documentation that the truckload contained no explosive hazards when received. This will be signed on company letterhead and state that the contents of the truckload will either be delivered directly to a solid waste landfill (for building or equipment debris); or, to a smelter (for equipment/metal debris) and 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.

I.5.D.10.02 Send notification and supporting documentation to truckload-generating contractor that the truckload has been delivered to the landfill (for building or equipment debris) or (for equipment debris), the contents of the truckload have been smelted and are now only identifiable by their basic content. This notification and supporting documentation will be incorporated by the contractor into the final report as documentation supporting the final disposition of the building/equipment debris.

BLANK

CHAPTER I

SECTION 6

EXPLOSIVES SAFETY DESIGN CONSIDERATIONS

I.6.A POSITION HAZARD ANALYSIS (PHA)

I.6.A.01 A PHA shall be prepared and updated as necessary, and documented by the supervisor of each USACE position as warranted by the hazards associated with the position's task.
***> See EM 385-1-1 Figure 1-1, and Figure I.6-1, below*.**

FIGURE I.6-1
POSITION HAZARD ANALYSIS

POSITION HAZARD ANALYSIS (PHA) FOR USACE EMPLOYEE	
NAME: (Print - Last, First, MI): JOB SERIES:_____ JOB TITLE:_____ JOB NUMBER (SF52):_____	Prepared by: (Print Name – Last, First, MI): Reviewed by (UXOSO):_____ Date (mo) _ _ (day) _ _ (year) _ _ _ _
COMMAND NAME & ORGANIZATION CODE:_____ PRIMARY DUTY LOCATION:_____	
Clearances Required EM OPS Team First Aid/CPR Respirator CDL Crane Operator Diver HTRW Other ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	

POSITION TASKS	**SAFETY AND/OR OCCUPATIONAL HEALTH HAZARDS***	**RECOMMENDED CONTROLS**
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
6.	6.	6.
7.	7.	7.

*Note - Examples of potential hazards are as follows:

Safety: trenching, electrical, slips, trips, fall hazards, etc.	Physical Agent: Exposure to heat/cold, noise, stress, vibration, radiation, etc.	Chemical: Exposure to solvents, cadmium, paints, welding fumes, pesticides, etc.	Biological: Exposure to bloodborne pathogens, poison ivy, insects, fungi, etc.

FIGURE I.6-1
POSITION HAZARD ANALYSIS (CONTINUED)

EQUIPMENT, MATERIALS, CHEMICALS TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
List for each task [include Material Safety Data Sheets(MSDSs)]	List inspection requirements for each work task	List safety/health training requirements
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
6.	6.	6.
7.	7.	7.
8.	8.	8.
9.	9.	9.
10.	10.	10.

The employee covered by this analysis has been instructed in the tasks to be performed, the hazards to be encountered, the potential adverse effects of exposure to such hazards and the controls to be used. He/she has received adequate training specifically related to safe work practices, administrative and engineering controls and personal protective equipment (PPE) to be used in order to ensure assigned work tasks are conducted in a safe and healthful manner. He/she has demonstrated an understanding of the safety and health equipment and PPE to be used to include its limitations, useful shelf-life, how to properly don, doff, adjust, and wear required PPE, and how to properly care for, inspect, maintain, store, and dispose of such equipment. Attached is documentation of the training received, dates of such training, and the subject matter taught.

Supervisor Signature_____ Employee Signature_____

Date __ __/__ __/__ __ __ __ Date__ __/__ __/__ __ __ __

I.6.B ACTIVITY HAZARD ANALYSIS (AHA)

> See EM 385-1-1, Figure 1-2; and Figure I.6-2, below.

I.6.B.01 Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA.

I.6.B.02 AHAs will define the activities being performed and identify the sequences of work, the specific hazards anticipated, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.

FIGURE I.6-2
ACTIVITY HAZARD ANALYSIS (AHA)

Date Prepared: _____

Project Location: _____

Prepared By: _____

Job/Task: _____

Reviewed By: _____

JOB STEPS	HAZARDS	CONTROLS	RAC
Identify the principal steps involved and the sequence of work activities.	Analyze each principal step for potential hazards.	Develop specific controls for potential hazards.	Assign Appropriate Risk Assessment Code (RAC) per AR 385-10.
EQUIPMENT	TRAINING	INSPECTIONS	
List equipment to be used in the work activity.	List training requirements.	List inspection requirements.	

CHAPTER I

SECTION 7

ELECTRICAL CONSIDERATIONS

I.7.A GENERAL

I.7.A.01 As a general rule, all disposal operations will be accomplished by electrical means to ensure maximum safety. There are exceptions to this requirement in situations where static electricity or EMR hazards are present. Unintentional detonations can occur because of these induced currents (or lightning). Follow DA Pam 385-64 precautions on electrical hazards.

BLANK

CHAPTER I

SECTION 8

HAZARD CLASSIFICATION AND CHARACTERISTICS FOR AE

I.8.A GENERAL. Hazard Classification and Characteristics for AE can be found on Table I.8-1.

Table I.8-1: Hazard Classification and Characteristics For AE

Hazard Classification/ Division	Definition
1.1	Mass-detonate. Mass-explosion. The principal hazards are blast and fragments
1.2	Non-mass explosion, fragment producing. HD 1.2 includes items configured for storage and transportation that do not mass detonate when a single item or package in a stack ignites. Explosions cause these items to burn and explode progressively, a few at a time, projecting fragments, firebrands, and unexploded items from the explosion site. Blast effects are limited to the immediate vicinity.
1.2.1	Those items with a net explosives weight for quantity-distance (NEWQD) > 1.60 pounds (0.73 kg) or that exhibit fragmentation characteristics similar to or greater than (higher density, longer distance). For example: M1 105 mm projectiles regardless of NEWQD Small quantities of HD 1.2.1 (< 450 pounds net explosives weight (NEW)), in certain packaging configurations, will react in a manner more typical of an HD 1.1 event. When located in structures that stop primary fragments, but which generate a secondary debris hazard (e.g. certain earth-covered magazine and hardened structures), the structural damage and debris hazards produced from these events again are more characteristic of an HD 1.1 explosion
1.2.2	Those items with an NEWQD < 1.60 pounds (0.73 kg) or that at most exhibit fragmentation characteristics similar to high-explosive 40 mm ammunition regardless of NEWQD
1.2.3	AE that does not exhibit any sympathetic detonation response in the stack test, and any reaction more severe than burning in the external fire test, bullet impact test, and slow cook-off test. Ammunition that satisfies the criteria for HD 1.6 with the exception of containing a non-EIDS device, or ammunition that does not exhibit any sympathetic detonation response in testing.

Table I.8-1: Hazard Classification and Characteristics for AE (Continued)

Hazard Classification/ Division	Definition
1.3	Mass fire, minor blast or fragment, firebrands. HD 1.3 includes items that burn vigorously and cannot usually be extinguished in storage situations. Explosions normally will be confined to pressure ruptures of containers and will not produce propagating shock waves or damaging blast overpressure beyond the magazine distance specified in the tables. Tossing about of burning container materials, propellant, or other flaming debris may cause a severe hazard of spreading fire.
1.4	Moderate fire, no significant blast or fragment. Items present a fire hazard with minimal blast, fragmentation, or toxic hazards.
1.5	Explosive substance, very insensitive (with mass explosion hazard
1.6	Explosive article, extremely insensitive
6.1	HD 6.1 includes items that contain only toxic or incapacitating chemical agents. Items containing both explosives and chemical agents are included in United Nation Organization Class 1, ammunition and explosives. The specific division (that is, 1.1, HD 1.2, and so forth) is based on testing IAW TB 700–2. Items containing both explosives and toxic chemical agents require application of both the appropriate HDs 1.1 through HD 1.4 quantity and distance as well as the HD 6.1 hazard zone distances. Hazard zones for toxic chemical agents are determined by the relative toxicity of the agents, the amount released to the atmosphere and the rate at which they are released (that is, evaporation, pressure, or explosives dispersal), terrain features, and meteorological conditions. Hazard zone calculations are based on maximum credible events (MCEs), using DDESB TP 10.

CHAPTER I

SECTION 9

HAZARD CLASSIFICATION OF MEC

I.9.A RECOVERED MEC

I.9.A.01 IAW TB 700-2, recovered MEC/UXO is to be considered HD 1.1 ammunition. All unidentified UXO shall be handled, transported and stored as HD 1.1 and appropriate compatibility group. UXO will be stored as unserviceable ammunition. ***> See DoD 6055.09- STD and Table I.9-1*.**

I.9.A.02 Recovered Chemical Warfare Materiel (RCWM) shall be managed as HD 1.1K until it is stored in an approved over pack (such as MRC) container, or until determined not be RCWM. Explosively configured RCWM will be managed as HD 1.2.1K with an explosive MCE of one round, once in an approved over pack container (such as MRC) or HD 1.2.2K based on its Net Explosive Weight Quantity Distance (NEWQD). In this storage configuration, it may be considered HD 1.1K, if advantageous for computing HFD using DDESB approved procedures. ***> See TP 16*.**

Table I.9-1: Storage and Handling of Commercial Explosives

DOT EX #	Name	DoD Hazard Classification	Date of Classification
9806054	Cord Detonating	1.1D	2 Dec 98
9803207	Detonator with fuse assembly	1.1B	12 Jan 99
9709010	Cap, Blasting, electric instant	1.4B Only when in DOT packaging	2 Dec 98
9707051	Cap, blasting, non-electric	1.4B Only when in DOT packaging	2 Dec 98
9608028	Shaped Charge, Commercial	1.4D	19 Sep 97
9608031	1 lb booster	1.1D	14 Jan 98
9508033	Fuse lighter commercial	1.4S	27 Oct 97
9404156	Shock Star MS (shock tube)	1.4S	14 Jan 98
9405290	Shaped Charge, commercial	1.4S	10 Mar 99
9409002	Shaped charge, commercial	1.4D	27 Oct 97
9308432	Pentolite booster	1.1D	14 Jan 98
9303285	Austin cast booster	1.1D	14 Jan 98
9303282	Cord, detonating, commercial	1.1D	14 Jan 98
9303278	Cap, NE, commercial	1.1B	14 Jan 98
9202035	Cord, detonating commercial	1.1D	19 Sep 97
9201092	Fuse, time, safety	1.4S	2 Dec 98
9104118	Cap, blasting electric, commercial	1.4B	19 Sep 97
9106259	Exel MS (shock tube)	1.4S	14 Jan 98
8912113	Demo charge, C-4, commercial	1.1D	27Jan99
8601111	Shaped charge, commercial	1.4S	10Mar99
8611125	Pentex Booster	1.1D	14Jan98
8511062	Cap, blasting, NE, commercial	1.4B	27Oct97
8311105	Safety Fuse, commercial	1.4S	27Oct97
8210044	Cord, detonating	1.1D	12Jan99

CHAPTER I

SECTION 10

EXPLOSIVES SAFETY FOR WARTIME OPERATIONS

I.10.A EXPLOSIVES SAFETY FOR WARTIME OPERATIONS

***> See Chapter 15, DA PAM 385-64*.**

I.10.A.01 This Section provides guidance for the safe handling, transportation, and storage of ammunition during wartime and contingency operations. This guidance provides options, based on the acceptance of ever increasing degrees of risk, to the commander faced with various and fluctuating battlefield hazards. It may be used in developing battle doctrine and integrated into contingency and combat operations planning.

I.10.A.02 The provisions of this section apply in:

a. A recognized war zone.

(1) An area where hostilities are imminent and approval to implement this chapter has been given in writing by the combatant commander.

(2) Several fundamental concepts govern the relaxation of peacetime explosives safety standards during combat and contingency operations and the acceptance of added risks:

(a) Whenever and wherever possible, the peacetime explosives safety standards enumerated in DA PAM 385-64 should be followed. Only after assessing the risks of relaxation against the mission-imposed parameters should the less restrictive guidance of this chapter be implemented. DA PAM 385-64, Chapter 15 provides operational flexibility not available in other parts of that pamphlet. The use of asset preservation criteria contained in that chapter is intended to maintain mission capability; however, those

reduced levels of protection may impair or delay mission capability in the event of an explosives accident. That chapter's explosives safety quantity distance (QD) standards include the following two levels of protection:

(i) Asset preservation distance. The distance that prevents propagation or reaction between potential explosion sites (PESs). (Assets at the exposed site are expected to be usable following an incident.) ***> See Table I.10-1*.**

(ii) Where QD considerations must be relaxed, preventing propagation and preserving personnel, military equipment, and ammunition should be paramount. In some situations that do not meet the specific requirement, equivalent protection can be provided by the use of protective construction or by restructuring the operation. Situations where equivalent protection is provided must be supported by analysis and approved by the appropriate level of command. Equivalent protection that meets the regulatory requirements are not considered a waiver or exemption.

(b) Tactical situations that are not covered by explosives safety regulations should be managed using the Army composite risk management (CRM, DA PAM 385-30) process. Commanders should identify the hazards associated with the operation, assess these hazards, develop controls and make a decisions based on the analysis and lastly, supervise and evaluate the operation and controls.

(c) The third factor in QD explosives safety calculations is time. The degree to which standards are relaxed should be directly related to the duration of the exposure. Relaxation of standards for 24 hours involves less risk than relaxation for 48 hours.

(i) The acceptance of a high degree of explosives safety risk depends on the competing hazards of the battlefield. The risk of an explosives accident may be far outbalanced by more imminent battlefield hazards as ammunition approaches the forward line of own troops (FLOT).

(ii) Ammunition logistical considerations and war fighting requirements should take precedence over compatibility in the mixing and grouping of ammunition items.

I.10.A.03 Hazard Class/Division 1.2 ammunition should be treated as HD 1.1. When it becomes impractical to manage ammunition by hazard class, all ammunition, except identifiable HD 1.4, should be treated as HD 1.1. All captured ammunition, mixed ammunition, and unserviceable or unknown ammunition will be treated as HD 1.1.

I.10.A.04 When handling ammunition in the field, the following general principles apply:

a. Soldiers controlling or supervising the handling of ammunition must observe safety precautions. Every effort will be made to ensure that skilled and knowledgeable personnel are in charge of ammunition operations.

b. In field storage, ammunition should be distributed in such a way that an incident will not cause the total stock of any one type of ammunition to be lost.

c. Ammunition will be dispersed to minimize loss in the event of fire, accidental explosion, or enemy action.

d. Fire fighting precautions must be taken and firefighting equipment must be serviceable. All fires will be fought immediately without special order.

e. Ammunition of unknown origin and captured ammunition will be examined, evaluated, and classified by qualified personnel and stored in a designated collection point.

f. The existing infrastructure and terrain features (for example, buildings, barns, forests, barriers, and so forth) will be used to prevent propagation and to protect personnel and material from the

effects of an explosion. Dry water courses will not be used during anticipated periods of heavy rain.

g. Ammunition containing WP will be stored and transported in an upright position if ammunition surface temperatures are expected to exceed 111 degrees F.

I.10.A.05 In any given field situation, all measures must be taken, to minimize the risk to personnel, material, and ammunition.

I.10.A.06 Provisions must be made to evaluate and, if necessary, segregate damaged ammunition.

I.10.A.07 Provisions should be made, particularly for contingency operations of expected short duration, to save and segregate packing material to be reused to turn in safely and transport unused ammunition.

Table I.10-1: HD 1.1 Quantity Distance Requirements using Minimum Separation and Asset Preservation Criteria

NEW in lbs.	Minimum Separation Distance	Asset Preservation Distance		NEW in lbs.	Minimum Separation Distance	Asset Preservation Distance
50	41	88		55000	418	913
100	51	111		60000	431	940
150	58	128		65000	442	965
200	64	140		70000	453	989
250	69	151		75000	464	1012
300	74	161		80000	474	1034
350	78	169		85000	484	1055
400	81	177		90000	493	1076
500	87	190		95000	502	1095
600	93	202		100000	511	1114
700	98	213		105000	519	1132
800	102	223		110000	527	1150
900	106	232		115000	535	1167
1000	110	240		120000	543	1184
1250	118	259		125000	550	1200
1500	126	275		130000	557	1216
2000	139	302		135000	564	1231
2500	149	326		140000	571	1246
3000	159	346		145000	578	1261
3500	167	364		150000	584	1275
4000	175	381		155000	591	1289
4500	182	396		160000	597	1303
5000	188	410		165000	603	1316
6000	200	436		170000	609	1330
7000	210	459		175000	615	1342
8000	220	480		180000	621	1355
9000	229	499		185000	627	1368
10000	237	517		190000	632	1380
12500	255	557		195000	638	1392
15000	271	592		200000	643	1404
17500	286	623		205000	649	1415
20000	299	651		210000	654	1427
22500	311	678		220000	664	1449
25000	322	702		225000	669	1460
30000	342	746		230000	674	1470
35000	360	785		235000	679	1481
40000	376	821		240000	684	1491
45000	391	854		245000	688	1502
50000	405	884		250000	693	1512

BLANK

CHAPTER I

SECTION 11

MATERIAL POTENTIALLY PRESENTING AN EXPLOSIVE HAZARD (MPPEH)

I.11.A MPPEH – CONTRACTOR RESPONSIBILITIES AND PROCEDURES

I.11.A.01 The U.S. Army Corps of Engineers' (USACE) contractors executing projects will comply with the following procedures for processing MPPEH for final disposition. The objective of these procedures is to ensure that an inspection procedure of the exterior and interior surfaces of all recovered MPPEH is in place to ensure these items do not present an explosive hazard. These USACE contractor responsibilities and procedures will be contained, or referenced, in the project WP. ***> See Chapter 14, EM 1110-1-4009.***

I.11.A.01.01 Unexploded Ordnance (UXO) Sweep Personnel will only mark suspected items and will not be allowed to perform any assessment of a suspect item to determine its status.

I.11.A.01.02 Unexploded Ordnance (UXO) Tech I can tentatively identify a located item as MPPEH, followed by a required confirmation by a UXO Tech II or III

I.11.A.01.03 UXO Technician II will:

a. Perform a 100% inspection of each item as it is recovered and determine the following:

(1) Whether the item is an UXO, a DMM, munitions debris, or range related debris;

(2) Whether the item contains explosives hazards or other dangerous fillers;

(3) Whether the item requires detonation;

(4) Whether the item requires demilitarization (demil) or venting to expose dangerous fillers;

(5) Whether the item requires draining of engine fluids, illuminating dials and other visible liquid hazardous, toxic or radiological waste (HTRW) materials.

b. Segregate items requiring demil or venting procedures from those items ready for certification.

c. Items found to contain explosives hazards or other dangerous fillers will be processed IAW applicable procedures.

I.11.A.01.04 UXO Technician III will:

a. Perform a 100% re-inspection of all recovered items to determine if free of explosives hazards or other dangerous fillers and engine fluids, illuminating dials and other visible liquid HTRW materials.

b. Supervise detonation of items found to contain explosive hazards or other dangerous fillers and venting/demil procedures.

c. Supervise the consolidation of MPPEH for containerization and sealing. Munitions Debris and Range-related Debris will be segregated.

I.11.A.01.05 UXO Quality Control (QC) Specialist will:

a. Conduct daily audits of the procedures used by UXO teams and individuals for processing MPPEH.

b. Perform and document random sampling (by pieces, volume or area) of all MPPEH collected from the various teams to ensure no items with explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials are identified as munitions

debris or range-related debris as required for completion of the Requisition and Turn-in Document, DD Form 1348-1A.

I.11.A.01.06 UXOSO will:

a. Ensure the specific procedures and responsibilities for processing MPPEH for certification as munitions debris or range-related debris specified in the WP are being followed.

b. All procedures for processing MPPEH are being performed safely and consistent with applicable regulations.

I.11.A.01.07 SUXOS will:

a. Be responsible for ensuring work and QC plans specify the procedures and responsibilities for processing MPPEH for final disposition as munitions debris or range-related debris.

b. Ensure a requisition and turn-in document, DD Form 1348-1A is completed for all munitions debris and range-related debris to be transferred for final disposition.

c. Perform random checks to satisfy that the munitions debris and range -related debris is free from explosive hazards necessary to complete the Form, DD 1348-1A.

d. Certify all munitions debris and range-related debris as free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.

e. Be responsible for ensuring that inspected debris is secured in a closed, labeled and sealed container and documented as follows:

(1) The container will be closed and clearly labeled on the outside with the following information: The first container will be labeled with a unique identification that will start with USACE/Installation Name/Contractor’s Name/0001/Seal’s unique identification and continue sequentially.

(2) The container will be closed in such a manner that a seal must be broken in order to open the container. A seal will bear the same unique identification number as the container or the container will be clearly marked with the seal's identification if different from the container.

(3) A documented description of the container will be provided by the contractor with the following information for each container; contents, weight of container; location where munitions or range-related debris was obtained; name of contractor, names of certifying and verifying individuals; unique container identification; and seal identification, if required. The contractor in a separate section of the final report will also provide these documents.

I.11.B MUNITIONS DEBRIS (MD) CERTIFICATION AND VERIFICATION

I.11.B.01 The contractor will ensure that MPPEH is properly inspected IAW the procedures in paragraph I.11.A . Only personnel who are qualified UXO personnel will perform these inspections. The SUXOS will certify the debris is free of explosive hazards and the OESS will verify the MPPEH inspection process has been followed. If an OESS is not on-site, the UXOQCS, or a similarly trained individual can be delegated to verify the MPPEH process.

I.11.B.02 DD form 1348-1A will be used as certification/verification documentation. All DD 1348-1A must clearly show the typed or printed names of the contractor's SUXOS and the OESS, organization, signature, and contractor's home office and field office phone number(s) of the persons certifying and verifying the debris as free of explosive hazards.

I.11.B.02.01 Local directives and agreements may supplement these procedures. Coordination with the local concerns will identify any desired or requested supplementation to these procedures.

I.11.B.02.02 In addition to the data elements required and any locally agreed to directives, the DD 1348-1A must clearly indicate the following for scrap metal:

a. Basic material content (Type of metal; e.g., steel or mixed);

b. Estimated weight;

c. Unique identification of each of the containers and seals stated as being turned over;

d. Location where munitions debris or range-related debris was obtained;

e. Seal identification, if different from the unique identification of the sealed container;

I.11.B.02.03 The following certification/verification will be entered on each DD 1348-1A for turn over of munitions debris or range-related debris and will be signed by the SUXOS and the USACE OESS. This statement will be used on any ranges where Range Related Debris is being processed along with munitions debris:

> *"This certifies that the material listed has been 100 percent properly inspected and, to the best of our knowledge and belief, is free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTWR materials."*

I.11.B.02.04 The following certification/verification will be entered on each 1348-1A for turn over of munitions debris and will be signed by the SUXOS on properties where only munitions debris is being processed:

> *"This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, is inert and/or free of explosives or related materials."*

I.11.C MAINTAINING THE CHAIN OF CUSTODY AND FINAL DISPOSITION

I.11.C.01 The contractor, in coordination with the USACE, will arrange for maintaining the chain of custody and final disposition of the certified and verified materials. The certified and verified material will only be released to an organization that will:

I.11.C.01.01 Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chained of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. This will be signed on company letterhead and stating that the contents of these sealed containers will not be sold, traded or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content.

I.11.C.01.02 Send notification and supporting documentation to the sealed container-generating contractor documenting the seal containers have been smelted and are now only identifiable by their basic content.

I.11.C.01.03 This document will be incorporated by the contractor into the final report as documentation for supporting the final disposition of munitions debris and range-related debris.

I.11.C.01.04 If the chain of custody is broken, the affected MPPEH must undergo a second 100 percent inspection, a second 100 percent re-inspection, and be documented to verify its explosives safety status (identified as either munitions debris or range related debris).

I.11.C.02 Material that has been documented as safe in no longer considered MPPEH as long as the chain of custody remains intact. A legible copy of inspection, re-inspection, and documentation must accompany the material through final disposition and be maintained for a period of three (3) years thereafter.

I.11.D RELEASE OF MPPEH

I.11.D.01 Material that is still MPPEH after inspection may be released only to a qualified receiver. The following must be accomplished prior to release of the property:

I.11.D.01.01 Ensure that MPPEH that has been documented as hazardous is only transferred or released to those entities that:

I.11.D.01.02 Have the licenses and permits required to receive, manage, or process the materials.

I.11.D.01.03 Have technical experts about the known or suspected explosive hazards associated with the MPPEH.

I.11.D.01.04 Are qualified to receive, manage, and process MPPEH IAW DoD Instruction (DoDI) 4140.62.

I.11.D.01.05 Have personnel who are:

a. Experienced in the management and processing of hazardous materials equivalent to the MPPEH.

b. Trained and experienced in the identification and safe handling of used and unused military and/or any potential explosive hazards that may be associated with the specific MPPEH.

I.11.D.02 The receiver must be advised of all of the potential hazards associated with the MPPEH and agree to receive and process the material IAW DoDI 4141.62.

I.11.D.03 All MPPEH shipments over public transportation routes must comply with DoD guidance that implements hazardous material transportation regulations.

I.11.D.04 Ensure that chain of custody and accountability records are maintained through final disposition of MPPEH. A legible copy of inspection, re-inspection, and documentation must accompany

MPPEH through final disposition and be maintained for a period of three (3) years thereafter.

CHAPTER II

EXPLOSIVES SAFETY FOR CONSTRUCTION/DEMOLITION ACTIVITIES

II.A GENERAL

II.A.01 Explosives safety for construction activities that may involve MEC is addressed in Chapter III and EP 75-1-2; and Chapter IV.C addresses requirements for the plan coordination/approval process.

II.A.02 Construction activities that use munitions in the performance of e.g., structural demolition and excavation activities are covered in Section 29 of EM 385-1-1. Below are additional requirements:

II.A.02.01 If work is performed with commercial explosives by DoD personnel (military or civilian) or a contractor on a DoD installation, the blasting plan (as specified on Section 29 of EM 385-1-1) is required to be submitted to USATCES (throughout the chain of command, ref. EM 385-1-97, Chapter IV.C) upon request. Commercial explosives require ACOM, ASCC, or DRU approval (DAPAM 385-64, Chapter 16-3.e&f) prior to purchasing/bringing the explosives to the installation. Generally, a special classification by USATCES (DAPAM 385-64, Chapter 16-3.c) is required to store commercial design explosives within the installation's storage magazines.

II.A.02.02 If work is performed with commercial explosives by DoD personnel (military or civilian) on other than a DoD installation, the blasting plan (as specified on Section 29 of EM 385-1-1) is required to be submitted to USATCES (throughout the chain of command, ref. EM 385-1-97, Chapter IV.C) upon request.

II.A.02.03 Non-DoD munitions transportation, handling, storage and use of explosives, and blasting agents and equipment shall be directed and supervised by a person of proven experience and

ability on these types of activities in accordance with ANSI A10.7; 29 CFR 1910.109; 29 CFR 1926, Subpart U; 27 CFR 555; the manufacturers, the Institute of Makers of Explosives (IME).

II.A.02.04 Exclusion Zones for the demolition site shall be established using the “best practices” approach by the contractor doing the work. The contractor will use industry accepted modeling programs to determine the requisite exclusion zones.

II.B ADDITIONAL REQUIREMENTS

II.B.01 Storage and handling of commercial explosives are addressed in Chapter I, Table I.9-1.

II.B.02 Plan coordination shall follow the coordination requirements for any other explosives safety plan requiring review/approval by higher HQs. ***> Reference Chapter IV.C.***

CHAPTER III

MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) ENCOUNTERED DURING USACE ACTIVITIES

III.A REQUIREMENTS

III.A.01 All Munitions and Explosives of Concern (MEC) or Material Presenting a Potential Explosive Hazard (MPPEH) encountered on jobsites shall be treated as extremely dangerous and must be reported immediately. MEC can be Unexploded Ordnance (UXO), Discarded Military Munitions (DMM), or Munitions Constituents (MC) in sufficient amounts or concentrations to pose an explosive hazard. MPPEH is material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris), or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

III.A.02 MEC or MPPEH, regardless of age or condition, shall be handled by UXO-qualified personnel (Ref. Technical Paper (TP) No. 18), UXO Technicians Level 1 when under supervision of UXO-qualified, OESS, or EOD personnel.

III.A.03 This section was developed because we recognize the potential hazard associated with MEC and MPPEH encountered during Corps operations or activities.

III.A.04 Activities performed by Corps employees or its contractors could be subject to encountering MEC or MPPEH if the land was used for military activities.

a. Due to weapons training, testing, manufacturing and demilitarization (including OB/OD) activities required to maintain a highly trained and ready military force to protect US national interests, thousands of acres of our Nation's land is known or suspected to contain MEC.

b. Even though DoD made an effort to remove/cleanup the explosives hazards before releasing the land from its control, some may remain.

c. Explosives hazards may have been pushed into depressions and covered with dirt or water or intentionally buried in pits. As such, explosive hazards may be found on land surface or subsurface, or bodies of water.

III.A.05 Where has MEC been found?

a. Areas currently or formerly under DoD jurisdiction [Formerly Used Defense Sites (FUDS)] used by the military (ranges, ammunition storage locations, munitions manufacturing areas, demilitarization and disposal sites or facilities).

b. In waters of the US [e.g., dredging, beach replenishment, clam harvesting (or recycled for use as roads and landscaping)].

c. Unauthorized disposal sites.

d. On private property (e.g. souvenirs or buried in private residence yards).

e. Other Federal Lands (transferred from DoD control).

f. Combat operation areas (civil war, e.g., cannon balls).

g. Recycling companies (e.g., lead smelters).

III.A.06 If you encounter or suspect to have encountered MEC or MPPEH**, DON'T TOUCH IT. Follow the 3Rs: RECOGNIZE, RETREAT AND REPORT**. Mark the location, keep people out of the area and report it. The site is now considered a potential munitions response site (MRS). ***> Note: The general location of the MEC hazard should be marked with tape, colored cloth, or colored ribbon. If available, attach the marker to a branch, structure or other existing object so that it is about 3 ft (.9 m) off the ground and visible from all approaches. Place the marker no closer than the point where you first recognized the MEC hazard and do not drive stakes into the ground or otherwise disturb the surface.***

III.A.06.01 If not on a DoD installation, anytime suspected MEC is encountered, immediately call the local emergency response authority (e.g., local police, sheriff, or 911) to report the finding. The Government Designated Authority (GDA) and Corps PM shall be notified immediately as well.

III.A.06.02 If on DoD installation, immediately notify your supervisor, GDA and Corps PM, installation POC (who shall contact and facilitate EOD response) or local emergency response authority (e.g., local police, sheriff, or 911) if not on DoD property.

III.A.06.03 Appendix H contains emergency POCs.

III.B ENCOUNTERING MEC

III.B.01 Prior to beginning construction operations or other activities, every effort shall be made to determine whether munitions-related activities ever occurred on the land/waters on which USACE operations or activities will take place. Installation or responsible authority will, based on available historical documents or prior environmental response actions, make an assessment determination for encountering MEC. This determination will be documented and used to plan the level of support required (e.g., no support, standby or on-call support, or a removal action within the footprint).

III.B.02 If the site has a negligible probability of encountering MEC (e.g., current or previous land use leads to an initial determination that MEC or MPPEH is not present), no support is required. However, if MEC or MPPEH is discovered, **STOP WORK,** mark the location, retreat from the area and report it to the appropriate personnel. Once MEC or MPPEH is found, the probability assessment will be re-evaluated.

III.B.03 If the site has a low probability of encountering MEC (e.g., current or previous land use leads to an initial determination that MEC or MPPEH may be present), only MEC standby support will be required. See EP 75-1-2, chapter 6 for details. If MEC or MPPEH is discovered – **RECOGNIZE**, **STOP WORK,** mark the location, **RETREAT** from the area and **REPORT** it to the appropriate personnel. Once MEC or MPPEH is found, the probability assessment will be re-evaluated.

III.B.04 If the probability of encountering MEC is moderate to high (e.g., current or previous land use leads to a determination that MEC was employed or disposed of in the area of concern) UXO-qualified personnel must conduct a subsurface removal for the known construction footprint. Before the removal action begins, an explosives safety submission [ESS (EPs 385-1-95b and 75-1-3)] will be prepared and approved by USACE, the U.S. Army Technical Center for Explosives Safety (USATCES) and the DOD Explosives Safety Board (DDESB), see DOD 6055.09-STD, Chapter 12. Contact the USACE Environmental and Munitions Center of Expertise, Military Munitions Division (CEHNC-EM-CX-MM, 256-895-1586) for guidance or assistance processing the required plan for the project.

III.B.05 Safety requirements for conducting MEC operations are also found in ER 385-1-95, EM 385-1-97, EP 385-1-95a, EP 385-1-95b, EP 75-1-2 and EP 75-1-3.

III.B.06 MEC authorization. Only authorized USACE Military Munitions Design Centers are permitted to design response actions. Design Centers or Remedial Action Districts are the only

authorized to execute response actions (see Table III.1). Requirements for government safety oversight are provided in ER 385-1-95, Appendix C.

III.B.07 Anomaly avoidance. Anomaly avoidance techniques are implemented to avoid any potential surface MEC or MPPEH and any subsurface anomalies. Anomaly avoidance techniques are primarily implemented during Hazardous, Toxic, and Radioactive Waste (HTRW) project activities, for example, in support of soil sampling or well installation activities where the specific site of the activity can be moved to another location. Any intrusive work in areas known or suspected to contain MEC or MPPEH must consider the type of activities to be performed and whether anomaly avoidance is sufficient or if construction support is required. Site escort support is required and provided by UXO-qualified or OESS personnel.

III.B.08 Dredging projects. Planning for dredging projects must consider the possibility of encountering MEC or MPPEH during operations, reference paragraph III.B.01. Plans shall include equipment (maintenance), material screening, and disposal procedures. The selected MM Design Center should be contacted to determine requirements on a case-by-case basis. General considerations include:

a. If a hydraulic dredge is used, it shall be equipped with a screen on the suction/intake end to prevent unwanted objects from reaching the removed sediment. The screen shall be capable of removing the smallest MEC item expected to be encountered. Additionally, screening mechanism of the same or smaller size is recommended at the outfall point of the dredge material.

b. If a mechanical dredge is used in a moderate to high probability dredging area, a plan to screen the oversize material shall be developed and approved.

c. Blast protection and shielding of equipment and personnel may be required.

III.B.09 If suspect Chemical Warfare Materiel (CWM) is encountered **STOP WORK IMMEDIATELY**. **RECOGNIZE, RETREAT AND REPORT**. Project personnel will withdraw along cleared path upwind from the discovery until appropriate responders arrive (reference paragraph III.A.06).

III.C EXAMPLES OF MEC ITEMS. This section contains examples of MEC items that may be found on a USACE project site. These items include**:**

III.C.01 GRENADES. There are three types of grenades discussed here: hand grenades; rifle grenades; and projectile grenades.

FIGURE III.1-a
HAND GRENADES

Hand grenades are small explosives or chemical-type munitions that are designed to be thrown at a short distance. Various types of hand grenades may be encountered as UXO, including fragmentation, smoke, and illumination grenades. All hand grenades have three main parts: a body, a fuze and filler.

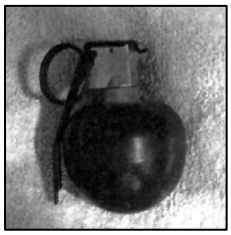
Mk-II Fragmentation grenade

Hazards: Cocked Striker, High Explosives (HE) & Fragmentation (Frag)

Weight: 1.3 lbs
Length: 4.5 in

FIGURE III.1-b
FRAGMENTATION GRENADES

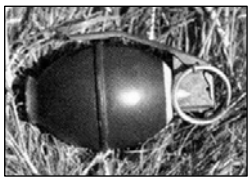
Fragmentation grenades are the most common type of hand grenade used. They have metal or plastic bodies filled with an explosive material. Other types of hand grenades may be made of metal, plastic, cardboard, or rubber and may contain, white phosphorus (WP), chemical agents (CA), or illumination flares, depending on their intended use. Most use a burning (pyrotechnic) delay fuze that functions 3 to 5 seconds after the safety lever is released, but some are activated instantly when the lever is released.



M33/67 Fragmentation Grenade

Hazards: Cocked Striker, HE & Frag

Weight: 0.875 lbs
Height: 3.530 in



M-26 Fragmentation Grenade

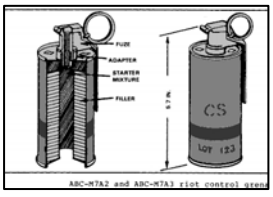
Hazards: Cocked Striker, HE & Frag

Weight: 1.00 lb
Length: 3.33 in

M34 - WP Grenade

Hazards: Cocked Striker, HE & Frag, WP, Smoke & Fire

Weight: 1.5 lbs
Length: 5.5 in



M7 Chemical Grenade (Riot Control) CS-Filled

Hazards: Cocked Striker, Chemical & Fire

Weight: 1.2 lbs
Length: 4.5 in

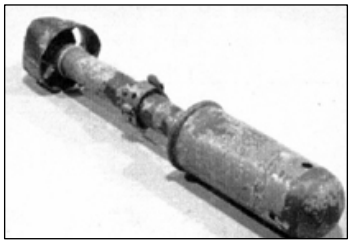
FIGURE III.1-c
RIFLE GRENADES

Rifle grenades look like small mortars and range from 9 to 17 in (22.86-43.18 cm) in length. They may be filled with high explosives (HE), WP, CS, illumination flares, or chemicals that produce colored screening/signal smoke. Rifle grenades are fired from standard infantry rifles. They have an opening at the tail end of a fin assembly that allows the rifle grenade to be placed on the barrel of a rifle.

M17 Fragmentation Rifle Grenade

Hazards: Impact/Inertia, HE & Frag

Weight: 2.2 lbs
Length: 9.4 in



M19 Rifle Grenade, Smoke WP

Hazards: HE, Frag, Fire, WP, Smoke/Incendiary, & Impact/Inertia

Weight: 1.50 lbs
Length: 11.31 in

FIGURE III.1-d
PROJECTED GRENADES

The most commonly used projected grenade is the 40 mm grenade. This grenade is also among the most commonly found UXO item. The 40mm grenade is about the same size and shape as a chicken egg. It can contain a variety of fillers such as HE, CS, illumination flares, or various colored screening/signal smoke mixtures. Because of their relatively small size, they are easily concealed by vegetation. They are extremely dangerous because of their sensitive internal fuzing systems and can be detonated by simple movement of if handled.

Projected Grenade M406 – 40MM HE
(New Unfired)

Hazards: HE, Frag & Movement

Weight: 0.503 lbs
Length: 3.894 in

Projected Grenade M406 – 40MM HE
(Fired)

Hazards: HE, Frag & Movement

Weight: 0.31 lbs
Length: 3.08 in

III.C.02 PROJECTILES. Projectiles can range from approximately 1 in (2.54 cm) to 16 in (40.64 cm) in diameter and from 2 in (5.08 cm) to 4 ft (1.22 m) in length. Projectiles can be fuzed either in the nose or the base of the projectile. A wide variety of fuzes and fillers can be found in the various types of projectiles. Some projectile fuzes are extremely sensitive to movement and will detonate if jarred or accidentally moved.

FIGURE III.2
PROJECTILES

Miscellaneous Projectile Fuzes

Hazards: Electromagnetic Radiation (EMR), HE, Frag, Cocked Striker, Movement & Static

Projectiles Ranging from 20MM and Up

Hazards: EMR, HE, Frag, Movement & Missile

M1 105MM HE Projectile

Hazards: HE & Frag

Weight: 39.92 lbs
Length: 28.60 in

FIGURE III.2
PROJECTILES (CONTINUED)

M456 105MM Heat Projectile

Hazards: EMR, HE, Frag, Jet (Shaped Charge), Lucky (Piezoelectric), Movement & Static

Weight: 20 lbs
Length: 26 in

Miscellaneous Spin Stabilized Projectiles

Hazards: EMR, HE, Frag, Jet (Shaped Charge), Cocked-Striker, Movement & Static

M371 90MM HEAT Recoilless Rifle Projectile

Hazards: EMR, HE, Frag, Jet (Shape Charge), Lucky (Piezoelectric), Movement & Static

Weight: 9.25 lbs
Length: 27.78 in

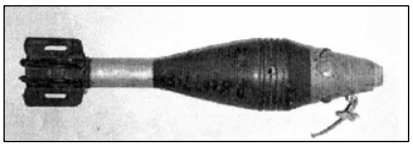
III.C.03 MORTARS. Mortars range form approximately 2 in (5.98 cm) to 11 in (27.94 cm) in diameter and can by filled with explosives, WP, or illumination flares. Mortars generally have thinner metal casing than artillery projectiles. They normally use fin stabilization but, some types can be found that use spin stabilization.

FIGURE III.3
MORTARS

M374 81MM HE Mortar

Hazards: HE, Frag & Movement

Weight: 9.340 lbs
Length: 20.838 in



M49 60MM HE Mortar (New)

Hazards: HE, Frag & Movement

Weight: 3.07 lbs
Length: 9.61 in

M3 4.2", 107MM HE Mortar

Hazards: HE, Frag & Movement

Weight: 26.20 lbs
Length: 23.05 in

81 mm M301A3 Illumination Mortar Projectile

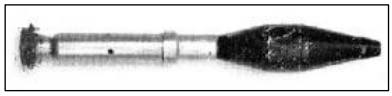
Hazards: Ejection & Fire

Weight: 10.1-10.7 lbs
Length: 24.73 in

III.C.04 ROCKETS. A rocket uses gas pressure from rapidly burning material (propellant) to propel a payload (warhead) to a desired location. Rockets can range from 1 ½ (3.81 c m) to more than 15 in (38.1 cm) in diameter, and that can vary from 1 ft (.3 m) to over 9 ft (2.74 m) in length. All rockets consist of a warhead section and a motor section. Rockets are unguided after launch and are stabilized during flight by fins attached to the motor section or by canted nozzles built into the base of the motor section. The warhead section can be filled with explosives, WP, submunitions, or illumination flares.

FIGURE III.4
ROCKETS

Warning: Fired rockets may still contain residual propellant that could ignite and burn violently!



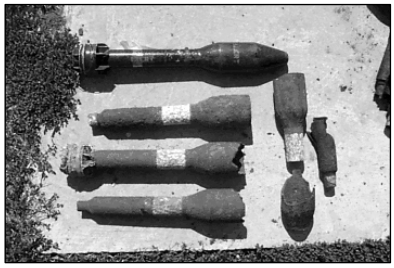
M72 Law 66MM Rocket

Hazards: Cocked Striker, HE, Frag, Jet (Shaped Charge), Lucky (Piezoelectric) & Missile

Weight: 2.300-lbs
Length: 19.987-inches

M7A2 2.36" Rocket Heat (Bazooka)
Hazards: EMR, HE, Fire, Frag, Jet (Shaped Charge), & Movement
Weight: 3.5 lbs
Length: 21.5 in

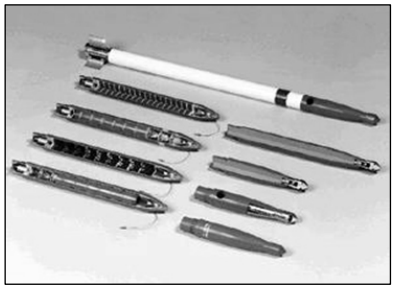
FIGURE III.4
ROCKETS (CONTINUED)



M28 3.5 in Heat Rocket

Hazards: EMR, HE, Frag, Jet (Shaped Charge), & Movement

Weight: 9 lbs
Length: 23.55 in



2.75 in Aerial Rocket System

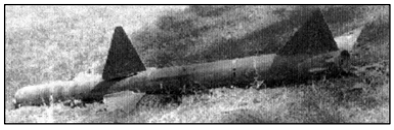
Hazards: EMR, HE, Frag, Jet (Shaped Charge), Static, Movement, Missile, Cock Striker, Submunitions, White Phosphorus, & Fire

Weight: 18.1 lbs
Length: 70 in

III.C.05 GUIDED MISSILES. Guided missiles are similar to rockets; however, they are guided to their target by various guidance systems. Some are wire-guided, and internal or external devices guide others. Fins controlled by internal electronics usually stabilize guided missiles. Guided missiles vary in size from man-portable, shoulder launched to very large intercontinental ballistic missiles.

FIGURE III.5
GUIDED MISSILES

Warning: Some guidance systems contain toxic materials, do not touch or handle missile components!
Warning: Fired guided missiles may still contain residual propellant that could ignite and burn violently!



AIM-7 Sparrow Missile (Air to Air)

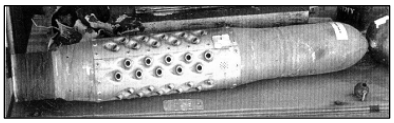
Hazards: EMR, HE, Frag, Fire, High Pressure (Accumulator), Mechanical, Electrical & Missile

Weight: 319 lbs
Length: 12 ft

BGM-71 TOW (Surface to Surface)

Hazards: EMR, HE, Frag, Fire, High Pressure (Accumulator), Mechanical, Electrical & Missile

Weight: 39.60 lbs
Length: 45.67 in



M47 Dragon Missile

Hazards: EMR, HE, Frag, Fire, High Pressure (Accumulator), Electrical, Missile, Static, & Unexpended Rocket Motors May Exist After Impact

Weight: 22.1 lbs
Length: 33.3 in

III.C.06 BOMBS. Bombs are dropped from aircraft and vary in weight from 100 (45.36 kg) to 20,000-lbs (9.07 MT), with lengths ranging from 6 in (15.24 cm) to 10-feet (3.05 m). Bombs consist of a bomb body and some form of stabilizing device (fin assembly) and may be fuzed in either the nose or the tail. There are two general types of bombs, “Old-Style” which date from the early 1920’s to the 1950’s and what are know as “Mk-80-Series” which date from the late 1950’s to the present.

FIGURE III.6
BOMBS

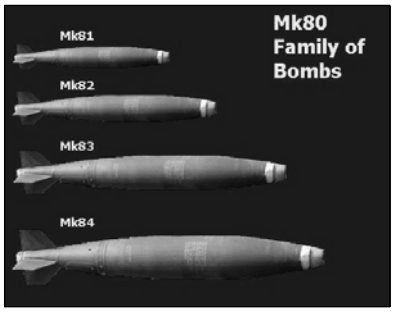
Bomb Fuzes

Hazards: EMR, HE, Frag, Electrical, & Movement

Old Style Series of Aerial Bomb

Hazards: HE, Frag, Movement, & Cock-Striker

Weight: From 100 to 2000-lbs
Length: Varied



Mk-80 Series New Style Aerial Bombs

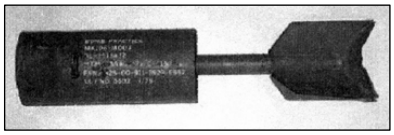
Hazards: HE, Frag, Movement, EMR, Static, Cock-Striker, & Influence (Magnetic/Acoustic)

Weight: 250 lb, 500 lb, 2000-lb, & 3000 lb
Length: Varied

III.C.07 PRACTICE BOMBS. Practice bombs are used to simulate the explosive filled bomb and will duplicate the same weight and dimensions of those bombs. They can also be found with very distinctive shapes and sizes. All practice bombs contain a "Spotting Charge" consisting of in some cases up to 23-lbs (11.34 kg) of HE. Although most practice bombs contain pyrotechnic charges that consist of red/white phosphorus and a propellant such as smokeless or black powder.

FIGURE III.7
PRACTICE BOMBS

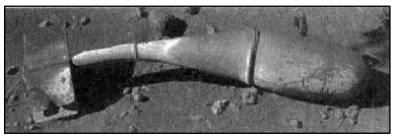
Warning: Practice bombs contain very dangerous pyrotechnic charges!



MK106 5 Practice Bomb

Hazards: Ejection, HE, Movement, & Smoke/Incendiary

Weight: 4.56 lbs
Length: 8.25 inches



BDU-33 Practice Bomb

Hazards: Ejection, HE, & Smoke/Incendiary

Weight: 23.8 lbs
Length: 22.5 in

Mk 5 Mod 0 Practice Bomb

Hazards: Ejection, Smoke, & Incendiary

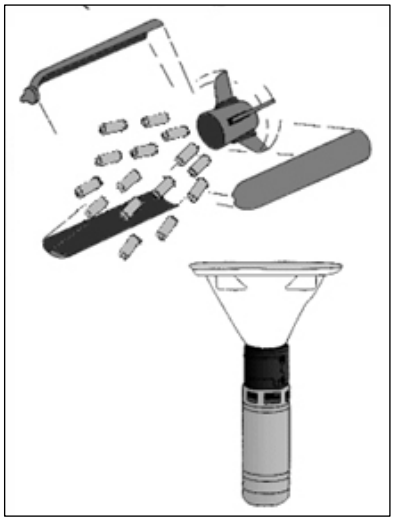
Weight: 2.68 lbs
Length: 8 in

III.C.08 DISPENSERS. Dispensers are used to carry and dispense submunitions payloads. They can be found either as aircraft dispensers or as artillery projectiles that eject (dispense) their submunition payloads.

a. Aerial dispensers generally look like medium size aerial bombs, except the construction of dispenser body is normally out of lightweight aluminum.

b. Projectiles that are designed to eject their submunition payload generally appear like any other projectile except there are some design features that allow the projectile body to eject its payload.

FIGURE III.8
DISPENSERS



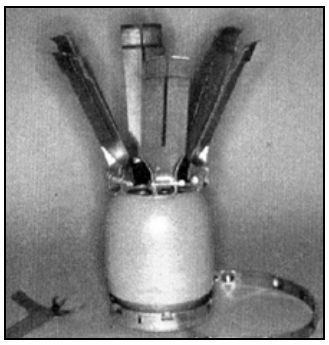
When the fuze in the dispenser functions above the target area, a length of explosive det-cord opens the dispenser container. When that occurs the individual submunitions within the container are spread-out over a large area.

SUU-30H/H (Dispenser) loaded on the wing of an attack aircraft.

III.C.09 SUBMUNITIONS. Submunitions are delivered in a container such as a projectile body or a dispenser that will dispense the submunitions in-flight over a target area. Submunitions come in a variety of sizes and shapes. Submunitions include bomblete, grenades, and mines that can be filled with explosives or chemical agent. They may be anti-personnel, anti-material, anti-tank, dual-purpose, incendiary, or chemical submunitions. Submunitions are activated in a variety of ways, depending on their intended use. Some are activated by pressure, impact, or movement/disturbance. Others are activated in flight or when they come near metallic objects. Some submunitions contain a self-destruct fuze as a backup. The self-destruct time can vary from a couple of hours to several days.

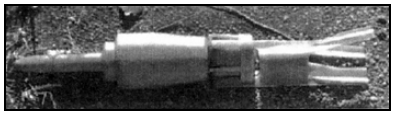
FIGURE III.9
SUBMUNITIONS

Warning: Submunitions are extremely hazardous because even very slight movement can cause them to detonate.



BLU-3 Aerial Dispersed Anti-Personnel Frag Bomb (New)

Hazards: HE, Frag, & Movement



MK118 Aerial Dispersed Anti-Tank Shape Charge (Field)

Hazards: EMR, HE, Jet (Shaped Charge), Lucky (Piezoelectric), & Movement

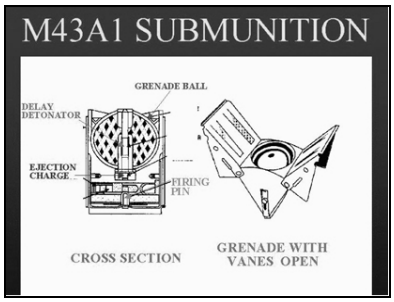
FIGURE III.9
SUBMUNITIONS (CONTINUED)

BLU-26 Aerial Dispersed Anti-Personnel Submunition.

Hazards: HE, Frag, & Movement

M42 Projectile Dispersed Dual-Purpose Submunitions.

Hazards: HE, Frag, Jet (Shape Charge), & Movement



Projectile Dispersed M43 Anti-Personnel Submunition

Hazards: HE, Frag, Ejection, & Movement

III.C.10 PYROTECHNICS. Pyrotechnics and pyrotechnic devices contain chemical compounds that when ignited will burn at extreme temperatures. They are primarily designed to produce either illumination (light) and/or various colors of smoke for signaling or screening purposes. Pyrotechnic devices can be found in a wide variety of sizes and shapes ranging from small hand held signal flares to large aerial illumination flares.

FIGURE III.10
PYROTECHNICS

155MM Illumination Candles

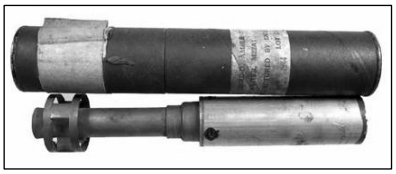
Hazards: Ejection, EMR, HE, & Smoke/Incendiary

Weight: 4.3 - 5.8 lbs
Length: 23 in

MK-45 Parachute Flare (Field)

Hazards: Ejection, EMR, HE, & Smoke/Incendiary

Weight: 28.6 lbs
Length: 3 ft



M18A1 White Star Cluster

Hazards: Ejection, & Incendiary

Weight: 17.49 oz
Length: 10.14 in

III.C.11 ITEMS THAT MIGHT CONTAIN CHEMICAL WARFARE MATERIEL.

FIGURE III.11-a
4 IN (10.16 CM) STOKES MORTAR

4 in (10.16 cm) Stokes mortar, an example of a round that could have an unknown filler. The differences between the chemical mortar and the smoke-filled and the high explosive filled mortars are in the length.

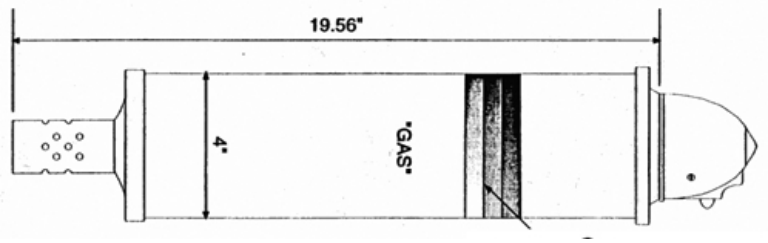


FIGURE III.11-b
8 IN (20.32 CM) LIVENS PROJECTILE

8 in (20.32 cm) Livens projectile, an example of a round that could have an unknown filler. There are virtually no external differences between the chemical projectile and the smoke-filled projectile.

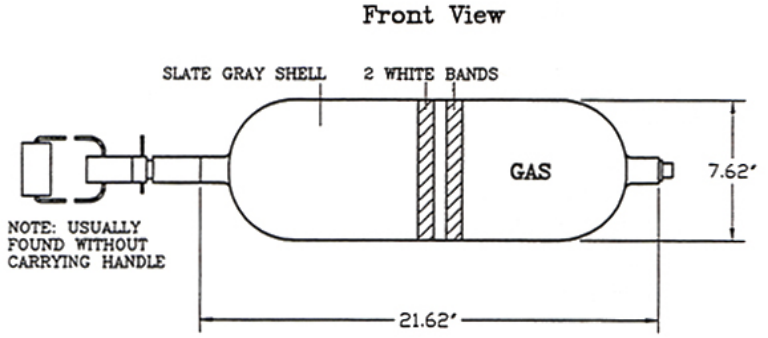


FIGURE III.11-c
4.2 IN (10.67 CM) GAS MORTAR

4.2 in (10.67 cm) Gas Mortar, an example of an item that might have an unknown filler. This model of mortar can have CA, WP smoke, and tearing agent, to mention a few. There are virtually no external differences, except possible fuzing combinations.

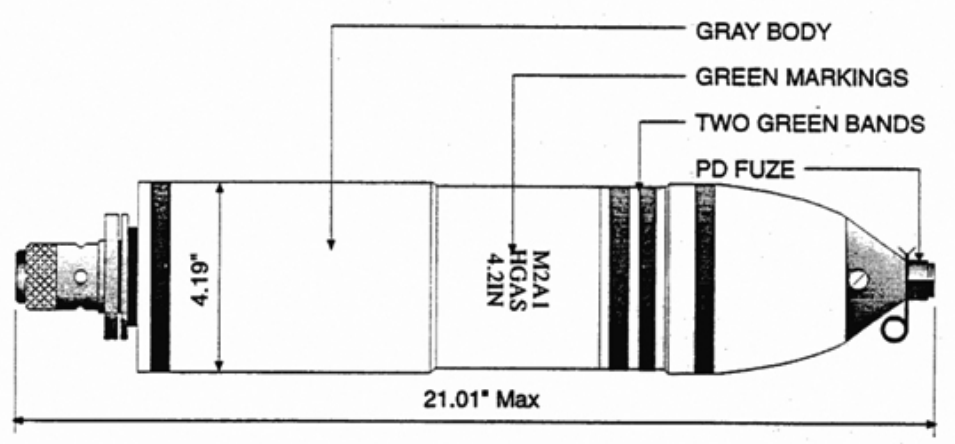


FIGURE III.11-d
K941 CHEMICAL AGENT IDENTIFICATION SET (CAIS)

This is an example of a suspect chemical item. It typically contains 24 bottles (2.5 liters (2500 ml) total weight) of distilled mustard (HD) or mustard (H and HS) agent.

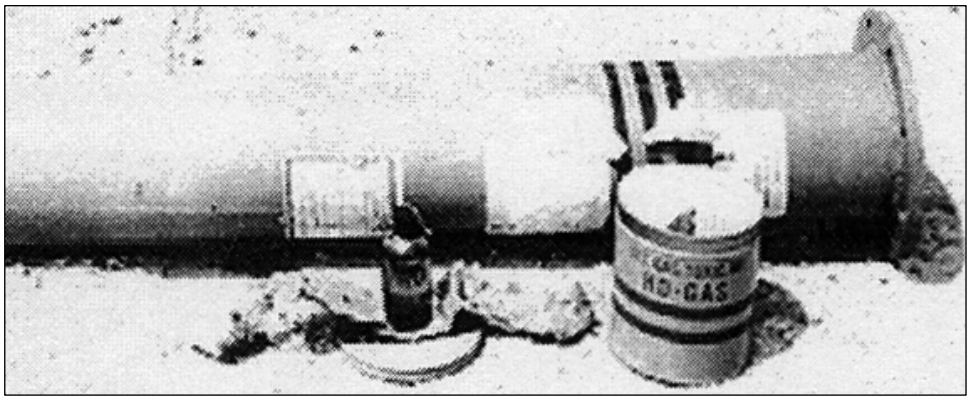


FIGURE III.11.e
K951/K952 CAIS

This is an example of a suspect chemical item. This could typically contain 48 pyrex, flame sealed ampules, 12 each containing 1.4 oz (2.66 ml) Zunce solution of mustard (H), a 5% solution in chloroform, Lewisite (L), a 5% solution in chloroform, Chloropicrin (PS), 50% solution in chloroform, and Phosgene (CG), 40 ml, full strength.

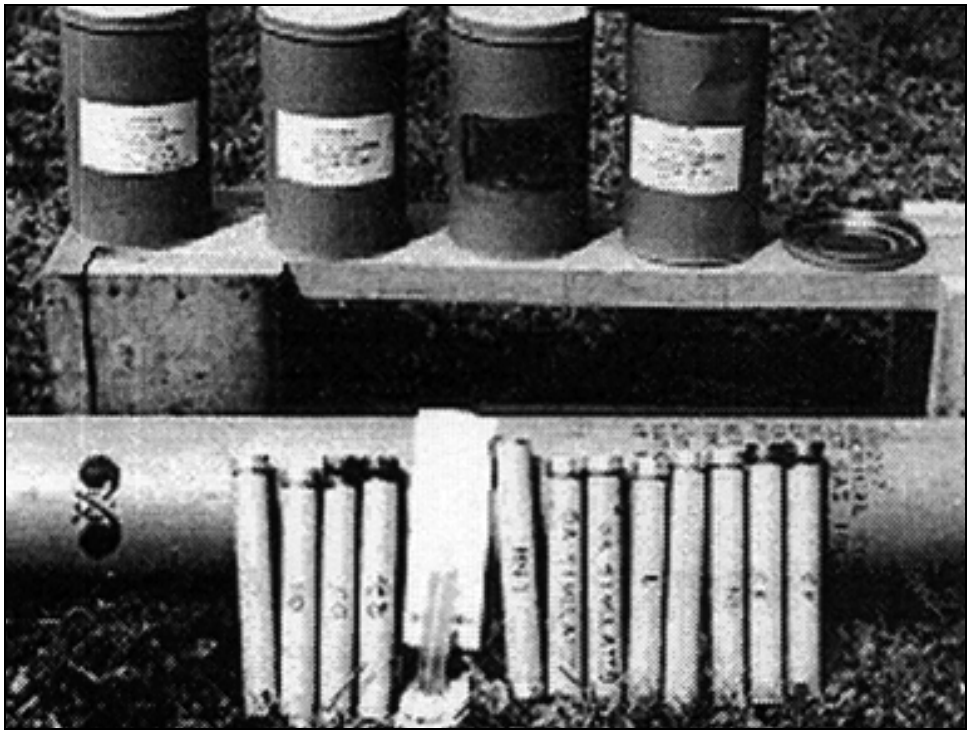


Table III.1: USACE Authorized MM Design Centers and Remedial Action Districts

Center of Expertise, MM Division, Huntsville Center, Phone: 256-895-1334

Design Centers

South Pacific Division
Phone: 505-235-4061

Omaha District
Phone: 402-995-2727

Baltimore District
Phone: 410-962-2252

Huntsville Center
Phone: 256-895-1709

Huntsville Center
RCWM
Phone: 256-895-1543

Remedial Action Districts

Sacramento District
Phone: 505-235-4061

Los Angeles District
Phone: 505-235-4061

Honolulu District
Phone: 808-438-6931

Baltimore District
Phone: 410-962-6728

Savannah District
Phone: 256-682-7546

Mobile District
Phone: 256-682-7546

Omaha District
Phone: 402-221-7709

Fort Worth District
Phone: 817-886-1872

Louisville District
Phone: 502-315-6300

Huntsville Center
Phone: 256-895-1709

Military Munitions Support Services (M^2S^2), Huntsville Center,
Phone: 256-895-1563

BLANK

CHAPTER IV

EXPLOSIVES SAFETY SITE PLANS (ESSP) REQUIREMENTS

IV.A GENERAL

IV.A.01 Purpose. To provide guidance for timely and effective preparation, coordination and review of facility explosives safety site plans (ESSP).

IV.A.02 Applicability. This guidance applies to US Army Corps of Engineers (USACE) design, siting and construction or modification of explosives facilities, and facilities other than explosives facilities, which would be exposed to ammunition and explosives (AE) risks if not properly located.

IV.A.03 Organizational Responsibilities.

a. HQUSACE.

(1) The Chief, Safety and Occupational Health Office, Headquarters USACE (CESO) shall:

(a) Designate a Safety Program Manager to manage and support the USACE explosives safety program.

(b) Develop and approve USACE explosives safety and health policy and procedures.

(c) Provide guidance on explosives safety and health issues within the framework of the overall USACE safety and health policy.

(d) Coordinate with higher headquarters and elements within the Headquarters, USACE, on explosives safety and health issues.

(e) Take the lead on explosives safety issues requiring conflict resolution within USACE and higher Headquarters and other

customers. Conduct periodic safety reviews to ensure program compliance with established requirements.

(f) Approve ESSPs and waivers. The lead for ESSPs has been delegated to the Huntsville Center.

(2) Chief, Engineering and Construction Division, HQUSACE Shall:

(a) Comply with DA and DDESB safety requirement for the design, siting and construction or modification/repair of facilities for manufacturing, handling, transporting, storing, maintaining, testing, developing and demilitarizing facilities of military explosives or ammunitions.

(b) Serve as the USACE engineer and construction manager, with responsibility for ensuring that explosives safety and health criteria and procedures are incorporated into the design and carried-out during construction on projects.

(c) Ensure full and proper integration of safety and health requirements into the ESSP process (PMBP 8016G) to include facility system safety (DA PAM 385-10).

b. Regional Business Centers (RBC) shall:

(1) Provide safety and health oversight, through the Safety and Occupational Health Office (SOHO), to ensure ESSP are in compliance with USACE and Army policy and procedures.

(2) Collaborate and share health and safety Staff resources located at the districts and/or request assistance from the USAESCH to ensure Project Delivery Teams (PDT) are appropriately staffed for the design and construction of ESSP.

(3) Ensure full and proper integration of safety and health requirements into the ESSP process (PMBP 8016G) to include facility system safety (DA PAM 385-10).

c. Commander, U. S. Army Engineering and Support Center, Huntsville (USESCH), CEHNC-ED-CS-S shall:

(1) Design ESSPs (AR 420-1, Appendix H-3.b and DA PAM 415-15, section III, Specific Facility Guidance, paragraph 2-16.b) for USACE projects and in support to Districts/customer [AR385-10, Chapter 5-6.c(2)], as requested.

(2) Serve as Direct Reporting Unit (DRU) lead for the approval of ESSPs and waivers.

(3) Provide and maintain state-of-the art trained personnel to conduct ESSPs functions and advise district personnel involved in ESSP projects.

(4) Review, approve and transmit ESSP waivers to USATCES for Army approval, as appropriate, or return through the chain to the RBC for projects where ESSP is returned to the customer for submission through their chain of command (e.g., Base Realignment and Closure (BRAC) and active installations).

(5) Develop ESSP safety awareness training as needed to support USACE mission needs and provide instructors as required.

(6) Ensure full and proper integration of safety and health requirements (PMBP 8016 G) into the ESSP process to include facility system safety (DA PAM 385-10).

(7) Maintain a database of ESSP exemptions and conditions for not complying with the DOD 6055.09-STD.

(8) Review, provide DRU approval, and submit design packages to DDESB through for standard protective construction designs. Such designs that are proposed for use on ESSP projects must have DDESB approval before construction begins. Approved standard protective construction designs are incorporated in DDESB TP 15.

(9) Maintain close coordination with USATCES through the preparation and review process of the ESSP.

(10) Maintain proficiency and utilize available tools for preparation and review of ESSP [for example, Composite Risk Management (CRM, DA PAM 385-30), Geospatial Information System (GIS) and the Explosive Safety Siting Software program (ESSS)].

d. The USACE Engineer Research and Development Center (ERDC) shall:

(1) Comply with RBC's responsibilities (paragraph IV.A.03.b.), review and comment on ESSP prepared by USACE laboratories, and transmit to USAESCH for DRU approval.

(2) Review and comment on ESSP prepared by USACE laboratories, and transmit to USAESCH for DRU approval.

(3) Ensure full and proper integration of safety and health requirements into the ESSP process to include facility system safety (DA PAM 385-10).

e. Districts shall:

(1) Ensure explosives facility project site is a real property master plan (RPMP) approved site (project's location conforms to land use and sustainable design and development (SDD) planning principles, the planned development of the installation, and that any special criteria (such as safety or environmental) have been considered and deficiencies either have been or will be rectified, or a waiver therefore will be obtained) prior to conducting a planning charrette.

(2) Ensure ESSPs are prepared and coordinated in compliance with USACE, Army, and Department of Defense (DoD) explosives safety and health policies and procedures.

(3) Ensure all documents pertaining to the ESSPs are included on the project file.

(4) Coordinate with RBCs for review and maintaining of project documents.

(5) Ensure full and proper integration of safety and health requirements into the ESSP process (PMBP 8016G) to include facility system safety (DA PAM 385-10).

(6) Ensure timely submittal of the ESSP through the established review/coordination process. Take into consideration the additional time required by each entity to review the plan, at least 60 days each.

(7) Provide funding and timely request for ESSP development /transmittal of prepared plans for review, and DRU approval/concurrence.

(8) Provide technical safety and health support (such as guidance documents and accident investigation, and committee participation) as requested by CESO.

(9) Provide mandatory review and comment as well as written concurrence or non-concurrence of ESSP documents.

(10) Ensure preliminary plan (ref. IV.B.03.a.) is prepared as soon as possible and maintain a total control of project schedules to ensure ESSP is prepared, reviewed and approved (ref. paragraph IV.C) in order to have an effective and efficient review process for a timely project construction or start-up.

(11) Not begin construction of the ESSP design until DDESB final approval is received at the installation where the project is to be constructed.

f. USATCES is responsible for ESSP review and Army approval.

g. DDESB is responsible for ESSP review and final approval.

IV.B REQUIREMENTS

IV.B.01 ESSP is required:

a. Construction of new AE facilities (e.g., manufacturing, handling, storage, disposal, maintenance, inspection, demilitarization, or testing AE, etc.)

b. Construction of new non-AE related facilities within the quantity distance (QD) arcs from a potential explosion site (PES).

c. AE facility modifications including but not limited to substantial dividing walls (SDW), lightning protection systems (LPS), footprint (size and placement of structure), electrical, and static grounding and bonding.

d. Change of AE mission in a facility or operation including but not limited to introduction of new, additional or increased risks [for example, operational changes, hazard class/divisions (HD), toxic chemical agent hazard, net explosive weight (NEW)].

e. Range support facilities (such as ammunition holding areas, storage pads, re-supply points, ammunition transfer points, loading docks, burn pans, and handling areas) that are designed, constructed, and used for recurring ammunition operations and that are located on or near ranges.

f. Ranges used for demilitarization and explosives ordnance disposal (EOD) training outside the designated impact areas.

g. Change in use of non-AE facilities or exposed sites (ES) that require application of more stringent explosives safety criteria (e.g., an airfield restricted to DOD use only changes to joint DOD and non-DOD use).

h. When non-AE exposed sites (ES) are exposed to blast, fire, or fragment hazards, or potential Army CA release due to changes in installation mission or facilities' usage.

i. When the results of an explosives safety audit (Explosives Safety Assistance Visit (ESAV), DDESB survey, Logistics Review, etc) determine a site plan is required.

IV.B.02 ESSP is not required for:

a. Facility construction plans to modify, change mission, or change operations that already have an existing explosives safety site plan providing they do not introduce additional explosives risks or do not increase NEW, chemical agent hazards, or personnel exposure.

b. Amnesty collection point; however, a risk assessment using the composite risk management process, is required. The installation fire department must be informed of all amnesty collection points and/or containers.

c. Existing AE facility without formally approved explosives safety site plans. The DOD 6055.09-STD, paragraph C1.3.5 lists exceptions, however, the exceptions must be documented (paragraph C1.3.5.4).

d. Facility built prior to 1 January 1958 if the facility is still used for its original purpose and newer facilities have not encroached on or changed the original siting. The date of construction and original use information must be documented in the permanent files of the garrison/installation.

e. Range support facilities that are only used to store and handle HD 1.4 ammunition.

f. This is applicable to addressing explosive hazards presented by explosively-configured ammunitions containing chemical agents but not the specific requirements and the specialized criteria that apply to Army chemical agents, although QD requirements for the explosive components of such ammunition items are included. AR 385-10, DA Pam 385-61, DA Pam 385-65, and DA Pam 385-64

should be consulted for more precise guidance on chemical safety site plan.

g. Construction not complying with DOD 6055.09-STD must be certified by the Service Secretary as necessary due to strategic or other compelling reasons. Exemptions to DDESB standards may be authorized per AR 385–64. Normally, exemptions will be granted only under the following conditions (AR 420-1, Appendix H, paragraph H–3):

(1) When immediate corrective measures are impractical.

(2) Where impairment of the overall defense posture would result.

(3) When positive programs for eventual elimination of the exemption's need are being pursued.

IV.B.03 Types of Facility ESSP Submissions. There are 2-types of ESSP submissions, preliminary and final. These plans can be submitted separately or combined into a single, final ESSP if sufficient information and details are available.

a. A preliminary ESSP.

(1) Used to establish a new or changed footprint for the QD and the NEW for ammunition and explosives (AE) facilities or operations before construction begins. The preliminary explosives safety site plan provides intended uses for the facility, the site location, and the distance relationship between the potential explosion sites (PES) and exposed sites (ES) and as many other details as are known about the siting. A preliminary explosives safety site plan approves the physical location and siting of the planned facility based on explosives safety standards. A preliminary explosives safety site plan should be submitted through command channels while the project is in the initial planning stages so the siting can be approved before the project is released for design. Appendix D contains a checklist of information required in a preliminary explosives safety site plan.

(2) The using agency will forward site plans, through command channels, to DDESB. Data specified in AR 385–64 will be included in the submittal. DDESB will provide preliminary site approval based on this submission. The designing agency, with the assistance of the using agency, will prepare all data required and provide it to the garrison commander for submission through command channels to DDESB for approval before the concept design review (35 percent design) or the parametric design review (10–15 percent design). Before final design can begin, DDESB preliminary plan approval must be forwarded by the garrison commander to the design agent, with copies to USACE, the appropriate Installation Management Command (IMCOM) region director, and the using agency (AR 420-1, Appendix H-3.b).

b. A final ESSP.

(1) Includes the same basic information as paragraph above and verifies the facility footprint, QD, and NEW, and should be submitted when facility construction details and explosives safety control measures are known and included in the design drawings. This should occur near but not later than the 60-65% design phase. The submitter should allow 180 days for Army and DDESB review and approval of ESSP.

(2) Approval must be received at the installation before construction is started. It provides additional specific facility construction information and details. Actual construction of a new facility, modification of an existing facility, or use of an unapproved site shall not occur until the DDESB approves the final site plan (DA PAM 385-65, paragraph 2-11, and AR 420-1, Appendix H-3.b). Appendix E contains a checklist of information required for a final ESSP.

IV.C ESSP APPROVAL PROCESS

IV.C.01 ESSPs are approved by DDESB through command safety channels to Director, U.S. Army Technical Center for Explosives Safety (AR 385–10, paragraph 5–6), Air Force Safety Center (AFSC), or Naval Ordnance Safety and Security Activity (NOSSA).

Approval is to be received prior to construction start. DoD 6055.09-STD requires that all ESSPs be approved by the DOD component (HQUSACE or installation DRU/ACOM/ASCC), the service component (USATCES, AFSC, or NOSSA) and DDESB before activities begin that involve the use of, exposure to, disposal of, or placement of, explosives on the site and is addressed through Command Safety channels to USATCES/AFSC/NOSSA to DDESB.

IV.C.02 With this guidance document, HQUSACE delegates Direct Reporting Unit review and approval of ESSP to the Commander, U. S. Army Engineering and Support Center, Huntsville (USAESCH) through CEHNC-ED-CS-S. HQUSACE and CESO retained the authority to review and approve ESSPs for certain high risk or high visibility projects and to provide dispute resolution with respect to issues that cannot be resolved between USAESCH and the concerned party.

IV.C.03 The following process will be followed (or electronic transmittal, if available) in the preparation and review of ESSP for:

a. USACE projects (such as Laboratories):

(1) The Laboratory prepares ESSP and forwards 4-hard copies to ERDC.

(2) ERDC reviews and comments, and forwards 3-copies to USAESCH.

(3) USAESCH, CEHNC-ED-CS-S reviews and provides DRU approval and forwards 2-copies to USATCES.

(4) USATCES reviews and provides Army approval, and forwards 1-copy to DDESB (including a copy of the Army and USACE approval memos).

(5) DDESB reviews and provides final approval back to through the same chain:
FLOW: Laboratory (prepare) → ERDC (review and comment) → USAESCH (review and DRU approval) → USATCES (review and

Army approval) ↔ DDESB (review and final approval). DDESB approval is returned in the same order to the Laboratory.

b. For installations [active, BRAC, Excess and/or off-post (other than USACE)] or the installation may request that USACE prepare the ESSP.

(1) USACE prepares:

(a) District prepares ESSP and forwards two (2) copies to the Division.

(b) Division reviews and comments, and forwards one (1) copy to USAESCH.

(c) USAESCH reviews and provides DRU concurrence, and forwards five (5) copies to the District with a copy of the memo to the Division.

(d) District forwards five (5) copies to the Installation.

(e) Installation reviews and comments, and forwards four (4) copies through their Command chain to their DRU/ACOM/ASCC.

(f) Installation DRU/ACOM/ASCC reviews and provides their approval, and forwards two (2) copies to USATCES (AFSC or NOSSA).

(g) USATCES (AFSC or NOSSA) reviews and provides Army approval, and forwards 1-copy to DDESB (including a copy of the Army, DRU/ACOM/ASCC and USACE approval memos)

(h) DDESB reviews and provides final approval back through the same chain:
FLOW: District (prepare) → Division (review and comment) ↔ USAESCH (review and comment and concur) and return to the District with a copy of the memo to the Division. District (forward) → Installation (review and comment) → Command chain to the DRU/AFSC/ASCC (review and approval) → USATCES (review and

Army approval) ↔ DDESB (review and final approval). DDESB approval is return in the same order to the Installation/District.

(2) Installation prepares:

(a) Installation prepares and forwards three (3) copies to the District.

(b) District reviews and comments, and forwards two (2) copies to Division.

(c) Division reviews and comments, and forwards one (1) copy to USAESCH.

(d) USAESCH reviews, comments and concurs, and forwards three (3) copies to the District with a copy of the memo to the Division.

(e) District forwards to the Installation.

(f) Installation reviews and comments, and forwards three (3) copies through their Command chain to the DRU/AFSC/ASCC.

(g) DRU/AFSC/ASCC reviews and provides their approval, and forwards two (2) copies to USATCES.

(h) USATCES reviews and provides Army approval, and forwards one (1) copy to DDESB (including a copy of the Army, DRU/ACOM/ASCC and USACE concurrence memos)

(i) DDESB reviews and provides final approval back through the same chain.

(j) CEHNCED-CS-S may conduct concurrent reviews of ESSP with installation DRU/AFSC/ASCC prior to submittal to USATCES: FLOW: Installation (prepare) → District (review and comment) → Division (review and comment) → USAESCH (review, comment and concur) ↔ back in the same order to the Installation → Command chain to DRU/AFSC/ASCC (review and their approval)

→ USATCES (review and Army approval) ↔ DDESB (review and final approval). DDESB approval is return in the same order to the Installation/District.

c. The District shall be in close coordination with the installation to ensure knowledge of any changes to the plan (changes to the plan will be coordinated with USAESCH, CEHNC-ED-CS-S).

d. DoD components and military departments will submit plans for host nation funded projects or modification of fixed or movable ammunition and explosives facilities to the DDESB for review and approval. Projects that may be affected by proximity to such AE operations are also subject to this approval process.

IV.C.04 Addresses for Routing and Approval of the Plan.

a. DDESB: Chairman, Department of Defense Explosives Safety Board (DDESB-KO), 2461 Eisenhower Avenue, Alexandria, VA 22331-0600.

b. USATCES: U.S. Army Defense Ammunition Center, U.S. Army Technical Center for Explosives Safety, ATTN: SJMAC-ES, 1 C Tree Road, Bldg 35, McAlester, OK 74501-9053.

c. Air Force Safety Center (AFSC), 9700 Avenue G SE, Kirkland AFB, NM 87117-5670.

d. Commanding Officer, Naval Ordnance Safety & Security Activity (NOSSA), Farragut Hall, 3817 Strauss Avenue Suite 108, Indian Head, MD 20640-5151.

e. CESO: USACE Headquarters, ATTN: CESO, 441 G Street, NW, Washington, DC 20314-1000.

f. USAESCH: U.S. Army Engineering and Support Center (Huntsville), ATTN: CEHNC-ED-CS-S, P.O. Box 1600, Huntsville, AL 35807-4301.

IV.C.05 ESSP Submittal Mode. Plan can be submitted as hard copies (as indicated in IV.C), compact disc (CD), electronic and email (PDF file). Be advised that DDESB is requiring total electronic submission by 2011. USATCES is working with NOSSA to implement an Army version of their Web Site Approval Request (WebSAR). The web-based system will allow you to create, track and have plans approved, and it is expected to be functional following FY08.

IV.D ESSP PREPARATION AND SUBMITTAL

IV.D.01 ESSP Planning and Coordination.

a. These plans shall be coordinated during the first planning charrette and throughout the process with installation/site: USAESCH; District safety office; Installation safety (DRU/ASFC/ASCC), explosives Safety professional a must; Installation Master Planning; Operating Units; Facility Engineering; Public Works; Logistics; Environmental and Health; Explosives Operations Ammunition Surveillance; Range Control (if the facility is range-related); Fire Department; and Security.

b. Coordination with the IMP to properly coordinate and assess the impact on other ongoing and future construction projects and plans. Every approved ESSP with the required QD arcs must be included on the IMP. ***> Refer to AR 420-1 and DA PAM 415-15.***

c. Obtain current installation and site maps. The importance of current accurate maps cannot be overstated. The key element for a good site plan is good maps that show the location of the facility and its relationship to surrounding installation boundaries, facilities, utilities, roads, railroads, waterways, ponds, lakes, recreation, fire stations, laboratories, storage magazines, outdoor storage, water tanks, fuel tanks, historical sites, equipment, maintenance, production and other operations. The sited facility map should be scaled 1” = 400’ or measurements specified on the drawings.

d. Reference paragraph IV.B.03 for types of submissions.

e. Appendix M is a tool to help the ESSP preparer identify the correct quantity distance relationship between common exposed sites (ES) and potential explosion sites (PES).

f. Explosives Safety Siting Software (ESSS) is a software application that automates the development of conventional ESSP. USAESCH has the system, related training and experience with it. Integration of the software into the installation's GIS mapping system will be the installation's responsibility. Appendix I and J are examples of ESS output report. Experience from software beta testing suggests that support may be required from the software developer to complete the software deployment. (The system can be obtained from USATCES at DSN 956-8919/8808, (918) 420-8919/8808, facsimile DSN 956-8503, (918) 420-8503, or email: mcal.dac.est.siteplans@conus.army.mil.for further information on obtaining this software).

g. Appendix I can also be used as an ESSP manual worksheet to assist with providing much of the required information. Find instructions, a completed sample form, and a blank template on the AKO DAC Explosives Safety Ammunition Toolbox at https://www.us.army.mil/suite/page/218481 under the heading "Tools, Templates and Information", select "Site Plan Tools, Site Plan Worksheet, Instructions with Form, Sample Worksheet, or Site Plan Worksheet Template" and download the forms.

h. DDESB developed an Excel spreadsheet that will calculate allowable NEW based on a given separation distance or the required separation distance for a given NEW. The Automated QD Calculator is on the DAC-USATCES website at https://www3.dac.army.mil/es/documents/QD%20Calculator.xls or AKO DAC Explosives Safety Toolbox at https://www.us.army.mil/suite/doc/11806433&inline=true. The spreadsheet is designed for either English or metric calculations. Users should input the desired NEW or DISTANCE in the appropriate yellow cell and hit "Enter". (Entries shall be input on the yellow cells only). Entering the NEW or DISTANCE will populate the spreadsheet. Call USATCES for help using this QD

Calculator. USATCES updates the websites as new versions of the Automated QD Calculator are disseminated.

IV.D.02 Content of an ESSP Submittal.

a. The ESSP transmittal memorandum should be approved and signed at the level of installation/garrison Commander, civilian equivalent, or his/her designee (see sample memorandum at Appendix Q).

b. The transmittal memorandum should be followed by tabulated items A through M.

(1) TAB A – Reserved for USATCES.

(2) TAB B – Expedited Review Request (use format at Appendix R).

(3) TAB C – Narrative. Provide background as applicable and a description of the facility and its mission. Briefly discuss the explosives operation and/or process for the facility/facilities [do not submit standing operating procedures (SOP)]. Examples:

(a) The ammunition supply point (ASP) at Fort XYZ is being expanded to accommodate two new Brigade Combat Teams assigned to Fort XYZ. The relocation of the two brigades is expected to be completed by the fall of 2011.

(b) The current ASP contains 15 earth-covered magazines (ECM), one (1) above-ground metal building used to store small arms ammunition, a two (2) bay surveillance inspection workshop, truck holding area, and operations field office. The current ASP received formal DDESB siting approval 11 June 1990. A copy of the DDESB approval is included as Enclosure 1 to this TAB.

(c) The expansion project for the ASP will include twelve (12) new seven (7) Bar ECMs, expansion of the current vehicle holding area from four (4) parking lanes to ten (10) parking lanes, a second

metal small arms warehouse, a residue turn-in and sorting facility, and a brass deformer.

(d) The contract award for construction is anticipated at the end of March (year) with actual construction of the new ASP facilities to begin in July (year).

(4) TAB D. Explosives Limits, use the Army standard Explosives Safety Site Plan worksheet format provided at Appendix I. This form can be downloaded, reference this guide, paragraph IV.D.01.h above.

(a) Section I. Self-explanatory.

(b) Section II, PES data. Provide the appropriate information for the facility being sited using the most limiting hazard class/division (HD) and NEW and the facility(s) requiring these limitations.

(c) Section III, Most Limiting ES for this PES. Use this section for the ES that represent the most limiting inhabited building distance (IBD), public traffic route distance (PTRD), intraline distance (ILD), and inter-magazine distance (IMD) exposures to the PES for each HD. If not applicable, indicate N/A for that exposure.

(d) Section IV, PES/ES QD Paired Relationships with Facilities Being Sited.

(i) Identify all facilities within IBD of the facility being sited. Validate the type of protection (IBD, PTRD, ILD, IMD or K factor) provided between the facility(s) being sited and all surrounding facilities with a paragraph or table reference under the NEW in the HD 1.1 through 1.4 columns.

> Note: An IBD arc is based on the requested/allowable NEW for the PES to be sited. All facilities within the IBD arc must be identified and considered in the siting process.

(ii) Facilities that are within the IBD arc of the PES being sited are non-explosive and do not require protection or consideration for siting purposes; list them as N/A.

(iii) Identify all surrounding PESs that project explosives safety QD arcs onto any part of the facility being sited. Identify these PESs even if they are outside the sited facility's IBD arc. Validate the type of protection (IBD, PTRD, ILD, IMD or K factor) provided for the PES being sited with a paragraph or table reference under the NEW in the HD 1.1 through 1.4 columns.

> Note: For example, a 3970' arc represents the maximum IBD requirement for an explosives facility with 500,000 lbs of NEW. Using an arc of 3970' from your PES assures that all ammunition and explosives facilities with a potential encroachment on the new facility are considered in the siting and will assure no conflict exists.

(iv) Explosives limits can be given for the whole building or with a breakdown by bay or room, depending on mission and siting requirements.

(v) Measure distances as accurately as possible between the closest wall or corner of the PES and the closest point of the ES. ES include but are not limited to other installation facilities, installation boundaries, public railways, waterways, and highways, and electrical transmission lines, distribution lines and electrical substations.

> Note: In certain instances where explosives or personnel exposures are controlled, you may use an inner wall, room, or bay for distance purposes instead of the outermost facility corner or wall. A thorough narrative explanation must be included in TAB C and accurate depictions on the maps/drawings are required.

> Note: Electrical substations include those major transformer locations within the installation where transmission and/or distribution lines are involved. These are

not to be confused with the single or multiple transformers found within individual service lines.

(5) TAB E, Installation map.

(6) TAB F, Site Map Scaled at 1" = 400' and/or Line Drawing as applicable. This map must have the IBD arc depicted and other arcs as necessary to clarify other limiting exposed sites listed in Section III [paragraph IV.D.02.b.(4)(c)] of the Explosives Safety Site Plan worksheet. Scale must be included in order to verify distances. North orientation must be noted on all maps. If individual room or bay limits are requested versus overall building limits, then applicable building and line drawings must be included in TAB F.

(7) TAB G, Lightning Protection System (LPS) drawings documentation.

(a) If magazines are built to a DDESB approved definitive drawing, then all that is required is provide the drawing number.

(b) Integral lightning protection system (LPS) drawings and system details must be included in TAB G or reference the information is included in Tab F.

(i) Drawing must show the spatial layout of LPS components, location of down conductors, and location of ground rods and/or ground loops.

(ii) Details must include air terminal height, conductor wire size, ground rod size, etc.

(iii) Elevation drawings of the building showing the LPS components.

(c) If the facility is protected by an overhead catenary LPS, drawings showing the facility, location of the catenary system and system details must be provided.

(i) Drawing must show the spatial layout of LPS components, location of down conductors, and location of ground rods and/or ground loops.

(ii) Details must include pole height, air terminal height, conductor wire size, ground rod size, etc.

(iii) Location of the facility being protected in relationship to the LPS.

(iv) Elevation drawings of the building showing the LPS.

(d) Fences or railroad tracks within six (6) feet must include details of the bonding into the LPS.

(e) Facilities that do not have LPS must have a Risk Assessment and command acceptance of the risk and possible loss of assets included in TAB G of the site plan submission. The memorandum format is provided at Appendix S.

(8) TAB H, Facility(s) Description and all the construction details/drawings necessary to determine the facility(s) meets current explosives safety construction standards (TM 5-1300).

(a) Construction of facilities using DDESB approved designs - approved designs are listed in TP 15 at http://www.ddesb.pentagon.mil/techpapers.html. If you are using an approved drawing, just provide the definitive drawing number, revision number, and facility size, e.g.:

Table IV.1: Determination of Facility's Explosives Safety Construction Standards

Earth-Covered Magazine	33-15-74	Rev 3/11 Jun 1998	25' x 80'
Earth-Covered Magazine	421-80-05	Basic/1 Sep 1998	25'11" x 60'
RC Box, Type M	10400001-10400027	5-Jan-04	81' x 124'
GOLAN-10	Mistral Security Inc.	N/A	N/A
Advanced EOD Magazine	ARMAG Corp	w/Pumice Lined Boxes	

(b) Standard drawings are included in EP 1110-345-2, Index of Army Designs for Military Construction. Drawings can be ordered from the USACE by calling (205) 895-1402 or by sending a memorandum to Commander, U.S. Army Corps of Engineers, Huntsville Center, ATTN: CEHND-ED-ES, P.O. Box 1600, Huntsville, AL 35807-4301.

> Note: As of the date of this guide, many standard drawings do not comply with the most up-to-date lightning protection system (LPS) and substantial dividing wall (SDW) requirements. Check with USACE or USATCES for more specific information.

> Note: The following web site lists the USACE standard drawings that are considered "limited reference". http://www.hnd.usace.army.mil/stddgn/SearchResult.aspx?Search=3&class=Limited%20Reference%20Design

(c) Provide drawings showing the building layout, construction, utilities, and other such details for facilities without previous DDESB design approval.

(d) In addition to standard design drawings, detailed drawings must be provided for all substantial dividing walls (SDW), barricades, static dissipation, surge suppression, bonding, etc.

(e) If the construction drawings for the facility cannot be located, provide as much information as possible and pictures.

(f) When the facility's design is being used to provide equivalent quantity-distance protection, design details and the supporting engineering analysis by a DDESB approved method must be included in the submission.

(g) When process or engineering controls are used to provide equivalent personnel protection, those details must be included with the submission. The same is true if other mitigating measures are used.

(9) TAB I, additional details that could affect explosives limits such as:

(a) Traffic routes: details, density, distances, and used by whom and frequency.

(b) Power lines: size, buried or overhead, distance, use, part of a grid, alternate routings.

(c) Utilities: fuel source (tank, lines), water (tank, lines), fiber optics, etc.

(10) TAB J, Glass Hazard Analysis must be completed and included in the site plan. If there is no glass hazard, state N/A for TAB J. Tips for completing the Glass Hazard Analysis are provided in Appendix N. A sample memorandum for accepting the glass hazard risk is also at Appendix N.

(11) TAB K, External Coordination. TAB K is for coordination and concurrence documents from other organizations with which the site plan was coordinated. External coordination could include concurrence by tenants, other services, other installations, etc. If there is no external coordination, state N/A for TAB K.

(12) TAB L, Miscellaneous Information.

(a) Certificate of Risk Acceptance (CRA, formerly called waivers and exemptions) identifies existing CRA, waivers, or exemptions that will be eliminated or modified by this site plan.

(b) Evaluation Program Findings. State whether the explosives safety site plan is a corrective action for a DDESB Explosives Safety Management Evaluation Program finding (formerly called DDESB Survey).

(c) Easement documents.

(d) The hazardous materials.

(e) The approved Preliminary Explosives Safety Site Plan if a preliminary was done.

(f) When Army chemical agents are involved, the requirements of AR 385-61 http://www.apd.army.mil/USAPA_PUB_pubrange_P.asp must also be addressed.

(13) TAB M**,** Risk-Based Siting Documentation, documents and analyses generated by the Safety Assessment for Explosives Siting (SAFER) program. This will only be used if the site plan is based on a risk-based analysis.

BLANK

CHAPTER V

EXPLOSIVES SAFETY FOR RESEARCH AND DEVELOPMENT (R&D) OPERATIONS

V.A REQUIREMENTS

V.A.01 Requirements for USACE MM R&D are under development. However, work shall be performed in accordance with DoD 6055-09-STD, AR 385-10, DA PAMs 385-10/61/62/64/69, 29 CFR 1910.1450, 29 CFR 1919.1200, when applicable.

V.B MINIMUM GUIDANCE REQUIREMENTS

V.B.01 Activity Hazard Analysis (AHA, Fig I.6-2) and SOP. Hazard analyses and detailed SOPs must be developed to ensure that the risks associated with these operations are minimized. That together with good laboratory practices will ensure the safety protection of people and real property from explosives and CA hazards associated with the operation or activity.

V.B.01.01 The CRM approach shall drive the safety and occupational health standards for each research and development laboratory operation.

V.B.01.02 Protective measures, equipment, and procedures should be determined through hazard analysis of each operation.

V.B.01.03 Each SOP shall be reviewed by the safety office and approved by the commander or his designated representative.

V.B.02 Storage. Explosives safety site plan (ESSP) for the storage of explosives and chemicals is on Chapter IV.

V.B.02.01 Laboratory quantities of energetic liquids (DoD 6055.09-STD, Table C9.T16) shall be stored and handled as prescribed by the controlling DoD Component. ***> NOTE: The required QD are only based on the energetic liquids' energetic reaction (blast***

overpressure and container fragmentation). These QD requirements do not consider the toxicity or potential down-wind hazard. Therefore, QD may not be the only factor that needs to be considered when selecting a location for storage and operations of energetic liquids.

V.B.02.02 Energetic liquids known to be contaminated or in a suspect condition shall be isolated and provided separate storage from all other energetic liquids pending laboratory analysis for verification of contamination and disposition requirements, if any.

V.B.03 Labeling.

V.B.03.01 Locations where chemical agents and munitions are stored, handled, used, and processed require the use of chemical hazard symbols. These symbols shall be used by themselves or in conjunction with fire symbols, as appropriate.

V.B.03.02 Each inner container and the outer container of chemical agents and agent candidates must be labeled with its agent and/or code name to properly identify the contents.

V.B.03.03 The label will have a red border and will have dimensions of at least 4 1/2 by 5 1/2 inches, when container size permits.

V.B.03.04 As necessary, the dimensions of labels for small inner containers may be as small as approximately ¼ of those stated above.

V.B.03.05 Those inner containers too small for complete information, as above, must have name or code name of agent clearly marked and may refer to remainder of information by locally determined system.

V.B.03.06 The color of inner and outer container labels, as well as information thereon, will be identical. Labels will contain the following information:

a. TOXIC CHEMICAL (in bold, red, capital letters).

b. The original issue quantity of agent in the container stated in metric terms and the concentration if diluted. This quantity should be updated, as required, when a formal inventory is conducted.

c. The operating activity responsible for storage and the numbers of the building and room where the material is stored.

d. The name and telephone number of the custodian of the material.

e. The date when the material was first placed in storage.

f. Special instructions or notes regarding use or removal of the contents.

g. Some method of identification of the person who prepared the solution or agent quantity.

V.B.04 Monitoring.

V.B.04.01 Air monitoring stations shall be established around toxic chemical agent operational areas and storage areas to determine if DoD 6055.09-STD, Table C11.T1 AEL are exceeded. In laboratory environments this requirement is met by routine area monitors and stack sampling.

V.B.04.02 Monitoring analyses conducted for the purpose of demonstrating compliance with AEL shall be based on DoD Component-certified reference materials.

V.B.04.03 Monitoring analyses conducted for the purpose demonstrating compliance with AEL shall be conducted under quality assurance plans that address the following issues:

a. Production, characterization, and storage of DoD Component-certified reference materials.

b. Documentation of precision, accuracy, and quantification limits of analytical methodology.

c. External oversight of laboratory results.

V.B.05 Ventilation.

V.B.05.01 Ventilation systems will be designed so that air flow is away from the operator and toward the potential source of agent. Air pressure within the laboratory will be maintained below that of surrounding areas and entry corridor.

V.B.05.02 A scheduled preventive maintenance program should be established to provide continued assurance of adequate ventilation performance.

V.B.05.03 Ventilation exhaust will not be re-circulated or used as makeup air for areas occupied by unprotected personnel. Makeup air diffusers will not be located so as to cause turbulence at the laboratory hood face.

V.B.05.04 Where ventilation is a sole or prime method of personnel protection, backup emergency power (automatic start generator) or other fail-safe systems should be installed to prevent exposure in the event of an unplanned power outage.

V.B.05.05 Ventilation hoods or glove boxes used for overnight storage of agent should not be used for any agent operation except transfers from storage and related dilutions unless only 100 ml or less of a single category of agent (for example, nerve agents versus vesicant agents) is stored therein, or unless agent is stored in a vault or refrigerator. Charged agent generators may be used in the same hood in which they are stored if no other agent is stored in that hood, or if another agent is stored in a vault or refrigerator.

V.B.06 Personnel practices.

V.B.06.01 All agents will be stored in a restricted laboratory, locked hood, or other facility to which access can be positively controlled.

V.B.06.02 Prior to assignment to such work, personnel who work with agents will be trained in the use and handling of toxic agents; in the donning, wearing, and doffing of protective clothing; in the use of decontaminating materials; and in procedures to be followed in the event of a spill or exposure.

V.B.06.03 When conducting agent activities, only personnel necessary to the operation will be permitted in the laboratory work area. However, a minimum of two qualified persons will be present.

V.B.06.04 Procedures will be established to ensure that the installation firefighting personnel and the security force are aware, and will be notified, of the presence and type of agent and room in which it is located in order to adequately respond to emergency situations.

V.B.06.05 The storage or consumption of food or beverages; the storage or application of cosmetics; the smoking or storage of smoking materials, tobacco products or other products for chewing; or the chewing of such product in all laboratory agent areas, is prohibited. Laboratory glassware will not be used to prepare or consume food or beverages.

V.B.06.06 Agent first-aid kits will be maintained in each laboratory operating or storage room.

V.B.07 Decontamination.

V.B.07.01 A supply of decontaminating material appropriate and adequate for the type and quantity of agent present and equipment for its use, if required, will be immediately available in the laboratory.

V.B.07.02 Each toxic chemical laboratory will develop and implement a chemical laboratory hygiene plan in accordance with 29 CFR 1910.1450, if applicable. This plan will be reviewed and concurred in by the lab safety manager and industrial hygienist.

V.B.08 Material safety data sheets (MSDSs). All laboratories will keep an inventory of hazardous chemicals and material safety data sheets on hazardous chemicals within the laboratory; the supervisor will ensure laboratory personnel are trained in accordance with section 1200, part 1919, title 29, Code of Federal Regulations (29 CFR 1919.1200) (Hazardous Communication Standard).

V.B.09 Disposal. The installation environmental coordinator should be consulted prior to disposal of hazardous chemicals.

V.B.10 Shipment. Ship chemical agents and research development test and evaluation (RDTE) solutions in accordance with DOT requirements for hazardous materials, title 49, Code of Federal Regulations (49 CFR). For RDTE solutions, consideration must be given to the chemical agents and the solvent present when determining the proper shipping name.

Appendix A

REFERENCES

SECTION I

REQUIRED PUBLICATIONS

27 CFR 555
Bureau of Alcohol, Tobacco, Firearms, and Explosives, Department of Justice Part 555-Commerce in Explosives

29 CFR 1910
Occupational Safety and Health Standards; 1450; Part 109, Explosives and Blasting Agents

29 CFR 1919.120
Hazard Communication

29 CFR 1926
Construction Standards; Subpart U, Blasting and the Use of Explosives

29 CFR 1960
Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters; Subpart I for Recordkeeping and Reporting Requirements

ANSI A10.7
Safety Requirements for Commercial Explosives and Blasting Agents

AR 50-6
Chemical Surety

AR 385-10
Army Safety Program

AR 385-63
Range Safety

AR 420-1
Army Facilities Management

CEHNC-EM CX Memorandum 2006
Abbreviated Site Safety and Health Plan(s) (ASSHP) for Sites with Suspected or Confirmed Munitions and Explosives of Concern (MEC), Environmental and Munitions Center of Expertise (EM CX

CEMP-CE Memorandum 2004
Interim Guidance – Notification Procedures for Discovery of Recovered Chemical Warfare Materiel (RCWM) During USACE Projects

DA PAM 40-8
Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agents GA, GB, GD, and VX

DA PAM 40-173
Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, and HT

DA PAM 385-10
Army Safety Program

DA PAM 385-30
Mishap Risk Management

DA PAM 385-40
ARMY ACCIDENT INVESTIGATION AND REPORTING

DA PAM 385-61
Toxic Chemical Agent Safety Standards

DA PAM 385-63
Range Safety

DA PAM 385-64
Ammunition and Explosives Safety Standards

DA PAM 385-65
Explosive and Chemical Site Plan Development and Submission

DA PAM 385-69
Safety Standards for Microbiological and Biomedical

DA PAM 385-72
Recovered Chemical Warfare Materiel Responses

DA PAM 415-15
Army Military Construction Program and Execution

DDESB Technical Paper (TP) 15
Approved Protective Construction

DDESB TP 16
Methodologies for Calculating Primary Fragments

DDESB TP 18
Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel

DoD 6055.09-STD
Ammunition and Explosives Safety Standards

ER 200-3-1
Formerly Used Defense Sites (FUDS) Program Policy

ER 385-1-92
Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities

ER 385-1-95
Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations

ER 1110-1-8153
Ordnance and Explosives Response

EM 1110-1-4009
Military Munitions Response Actions

EM 385-1-1
Safety and Health Requirements

EP 75-1-2
Unexploded Ordnance (UXO) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities

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

EP 385-1-95a
Basic Safety Concepts and Considerations for Ordnance and Explosives Operations

EP 385-1-95b
Explosives Safety Submissions (ESS)

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

EP 1110-3-8
Public Participation in the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS)

EP 1110-345-2
Index of Army Designs for Military Construction

PMBP Manual Reference Document-8016G
Safety and Occupational Health Plan

USACE Supplement 1 to AR 385-40
Accident Reporting and Records

U.S. Army Technical Manual 5-1300/NAVFAC P-397/AFR 88-22
Structures to Resists the Effects of Accidental Explosions

SECTION II
RELATED PUBLICATIONS

CESO-E Memorandum 1998
Applicability of Biological Warfare Materiel and Non-Stockpile Chemical Warfare Response Activity Interim Guidance, 13 Apr1998

DA Memorandum 1997
OASA (I&E), Interim Guidance for Biological Warfare Materiel (BWM) and Non-Stockpile Chemical Warfare Materiel (CWM) Response Activities, 5 Sep 1997

DA Memorandum 2005
OASA (I&E), Munitions Response Terminology

DACS-SF Memorandum 1998
Applicability of Biological Warfare Materiel and Non-Stockpile Chemical Warfare Materiel Response Activity Interim Guidance, 19 Mar 1998

DACS-SF Memorandum 2000
Approval of Safety Submissions for Non-Stockpile Chemical Warfare Materiel Response Activities, 29 Feb 2000

DACS-SF Memorandum 2000
Amendments and Corrections to Safety Submissions for Non-Stockpile Chemical Warfare Materiel Response Activities, 20 Sep 2000

DASA-ESOH Memorandum 2004
Implementation Guidance Policy for New Airborne Exposure Limits for GB, GA, GD, GF, VX, H, HD, and HT

AR 75-14
Interservice Responsibilities for Explosive Ordnance Disposal

AR 190-11
Physical Security of Arms, Ammunition, and Explosives

AR 200-2
Environmental Effects of Army Actions.

AR 210-21
Army Ranges and Training Land Program.

DA PAM 40-8
Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agent GA, GB, GD, and VX Operations

DA PAM 40-173
Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Mustard Agents H, HD, AND HT

DA PAM 50-6
Chemical Accident or Incident Response and Assistance (CAIRA)

DoDI 4140.62
Management and Disposition of Material Potentially Presenting and Explosive Hazard (MPPEH)

EP 1110-1-18
Ordnance and Explosives Response

ER 5-1-10
Corps wide Areas of Responsibility.

ER 5-1-11
Program and Project Management.

ER 210-3-2
Army Range Programs.

NFPA 780
Standard for the Installation of Lightning Protection Systems

TM 9-1300-214
Military Explosives

TM 60 Series Publications
Explosive Ordnance Disposal (EOD) Procedures

TB 700-2
Department of Defense Ammunition and Explosives Hazard Classification Procedures

TB 700-4
Decontamination of Facilities and Equipment

USATCES-Explosives Safety Site Plan Developer's Guide

BLANK

APPENDIX B

BLANK

BLANK

APPENDIX C

CEHNC FORM 948

(This form may not be used by all Removal/
Remedial Action District or MM-DCs)

U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE
ORDNANCE AND EXPLOSIVE GROUP
MEMO

TO:	**DATE:**	**TIME:**
CONTRACT NUMBER:	**PROJECT LOCATION:**	
DO #:		

SUBJECT ITEM(S) (Check all that apply):

- ☐ Work Plan
- ☐ Safety Violation
- ☐ Safety Comments
- ☐ Quality Control
- ☐ Other

DESCRIPTION: _____

_____

_____

_____

_____

_____

_____

☐ Prompt correction or compliance with contract specifications is requested.

_____
USACE Site Representative

RECEIPT ACKNOWLEDGED: _____
Contractor's Representative

ACTION TAKEN:

CEHNC FORM 948 (Revised) 1 APR 96 — **COPY 1 - Contractor's Representative**

BLANK

APPENDIX D

PRELIMINARY EXPLOSIVES SAFETY SITE PLAN (ESSP) CHECKLIST

Checklist of Essential Elements
Memorandum (Appendix Q will help in preparing the memo)
MCA number if applicable
Requested approval date or required expedited approval date w/justification
DDESB Survey finding (if appropriate)
Waivers—corrected or affected
Exemptions—corrected or affected
Statement that proposed facility is reconciled with installation master plan (IMP)
Description, use, and occupancy of proposed facility
Proposed facility explosives limits (NEW by HD) (Appendix I & M will help in establishing NEW/QD limits)
Description, use, and occupancy of all facilities (actual or planned) within IBD of proposed facility. Show distances between proposed facility and all other facilities within IBD. Include NEW and HD for all PES.
Description, use, explosives limits, and occupancy of all AE facilities (actual or planned) that cast QD arcs over the facility being sited. Show distances from all other AE facilities that cast QD arcs over the facility being sited.
Installation map showing location of proposed site
Topographical maps as appropriate and available
Map scaled 1”=400’ with proposed facility footprint and all surrounding facilities (actual or planned).
Public railways, waterways, and highways
Power transmission lines
Power distribution lines
Electrical transformer stations
Drawings (preliminary design when available)
Glass Hazard Assessment

BLANK

APPENDIX E

FINAL EXPLOSIVES SAFETY SITE PLAN (ESSP) CHECKLIST

Checklist of Essential Elements
Memorandum (Appendix Q will help in preparing the memo)
Preliminary explosives safety site plan approval if applicable
Provide all information requested/applicable that is changed or not provided in the preliminary explosives safety site plan
MCA number if applicable
Requested approval date or required expedited approval date w/justification
DDESB Survey finding (if applicable)
Waivers—corrected or affected
Exemptions—corrected or affected
Statement that proposed facility is reconciled w/installation master plan (IMP)
Description, use, and occupancy of proposed facility
Proposed facility explosives limits (NEW by HD) (Appendix I & M will help in establishing NEW/QD limits)
Description, use, and occupancy of all facilities (actual or planned) within IBD of proposed facility. Show distances between proposed facility and all other facilities within IBD.
Description, use, explosives limits, and occupancy of all AE facilities (actual or planned) that cast QD arcs over the facility being sited. Show distances from all other AE facilities that cast QD arcs over the facility being sited.
Installation map showing proposed site
Topographical maps as appropriate and available
Map scaled 1”=400’ with proposed facility footprint and identifies all AE facilities (actual or planned) that cast QD arcs over the facility being sited
Public railways, waterways, and highways

Checklist of Essential Elements (Continued)
Power transmission lines
Power distribution lines
Electrical transformer stations
Drawings
Fire walls
Roof construction and materials
Operational shields
Barricades
Doors and door hardware
Windows and details on frames, mounting and glazing (other)
Type floor covering/finishes (chemical explosives safety site plans only)
Conducting Floors if applicable
Fire protection, detection and suppression (sprinklers, deluge, alarms, etc.)
Electrical systems and equipment
Heating, ventilation, and air conditioning systems
Hazardous waste disposal systems (filters, sumps, etc)
LPS
Static grounding and bonding
Cables, wires, pipes and other conductors entering the facility
Process equipment
Security system
Auxiliary support structures
Plot plans
Technical data (risk assessments performed or protective construction analysis)
Individual bay limits if applicable
Perform Glass Hazard Assessment

APPENDIX F

CORRECTIVE ACTION REQUEST (CAR)

CORRECTIVE ACTION REQUEST	**NO.** *(1,2,3, etc. for the T.O.)*
USACE Representative: Date Issued: Issued to: (*Contractor*) Response Due: (*Based on type of nonconformance*) Contract # and T.O. # Project Name/Location:	
Nonconformance Type (circle one): Critical Major Minor	
Description of Condition Found:	
Apparent Cause:	
(The Contractor will provide the following information to the Contracting Officer and USACE PM by the "Response Due" date above. Please contact the USACE Representative listed above if you have any questions)	
Actual Cause: (Contractor will investigate and determine cause of condition reported above. Actual cause should be stated as specifically as possible)	
Action Taken to Correct Condition: (Corrective Action should address root cause, not the symptom)	
Action Taken to Prevent Recurrence:	
Action Taken to Monitor Effectiveness of Corrective Action: (Generate data as proof. State the monitoring method put in place and who is responsible for reviewing data.)	
Contractor Representative Signature/Title/Date Signed: (Form must be signed before returning)	

CORRECTIVE ACTION REQUEST	**NO.** *(1,2,3, etc. for the T.O.)*

(USACE Project Team Use Only)

Review of Corrective Action:

1) Has condition improved? ___ Yes ___ No

2) Additional corrective action required? ___ Yes ___ No

Comments:

Completed form provided to Contracting Officer: (Date)

APPENDIX G

GENERIC ON-SITE QA CHECKLIST

Project Name/Contract No. _____

Audit Date (Start): _____ **Audit Date (End):** _____

CHECKPOINTS:

1. Review Scope of Work (DO/TO & WP)	**YES**	**NO**	**N/A**	**COMMENTS**
a. Objectives Clearly Identified	□	□	□	
b. Check for Changes to WP & Up To Date	□	□	□	
c. Proper Depth of Clearance Identified	□	□	□	
d. Proper Target Ordnance Identified	□	□	□	
e. Detection & Target Depth(s) Specified	□	□	□	
f. Exclusion Zone Identified in WP	□	□	□	
2. Documentation Requirements	**YES**	**NO**	**N/A**	**COMMENTS**
a. Notice to Proceed from KO	□	□	□	
b. Approval Letter for Work Plan/SSHP	□	□	□	
c. Approval Letter, FAA (If Required)	□	□	□	
d. Certificate of Grounding, Lightning Protection (if required)	□	□	□	
e. Explosive Permits/License (if required)	□	□	□	
f. GFE Transfer Documentation (if required)	□	□	□	

2. Documentation Requirements (Continued)	**YES**	**NO**	**N/A**	**COMMENTS**
g. Approval Letter, Public/Personnel Withdraw Distance (e.g., 1 Frag in 600 sq. ft.)	□	□	□	
h. Dig Permits for Utilities (if required)	□	□	□	
i. Current copy of the Work Plan on site. Review the new contract to determine if approval of the work plan is required. If not, then delete the requirement to have an approval letter on site	□	□	□	
3. CEHNC QA Files Established	**YES**	**NO**	**N/A**	**COMMENTS**
a. Quality Assurance Reports	□	□	□	
b. Approval Letter's (NTP, Personnel & WP/SSHP) for Contractor Operations	□	□	□	
c. Weekly Contractor Reports SUXOS/QC	□	□	□	
(if provided)				
4. Site-Specific Safety & Health Plan (SSHP)	**YES**	**NO**	**N/A**	**COMMENTS**
a. Emergency Notification List Posted & Available	□	□	□	
b. Emergency Routes/Maps Available & Issued to Each Team	□	□	□	
c. Work Task Identified in Hazard Analysis, Approved SSHP	□	□	□	
d. MSDS(s) On-Site Approved SSHP	□	□	□	

4. Site-Specific Safety & Health Plan (SSHP) (Continued)	**YES**	**NO**	**N/A**	**COMMENTS**
e. Visitors/Safety Briefing Log Current and Updated	□	□	□	
f. All Personnel On-Site in the Proper PPE	□	□	□	
g. Minimum of Two Personnel On-Site First Aid/CPR Trained, EM 385-1-1, Section 3, Page 19, Paragraph 03.A.02	□	□	□	
h. 16-Unit First Aid Kits or Kits Approved by a Licensed Physician in the Ratio of one for every 25 persons or less. EM 385-1-1. Section 3, Page 19, Paragraph 03.A.03	□	□	□	
5. Technical Management	**YES**	**NO**	**N/A**	**COMMENTS**
a. Procedures Established for the Discovery of RCWM	□	□	□	
b. Procedures Developed for Discovery of MEC which cannot be destroyed in place	□	□	□	
c. Project Grid Size, Layout, Lane Width (e.g., 5’ or Less) Established	□	□	□	
d. Established Procedures for Changed Site Conditions	□	□	□	
e. Organizational Chart current and indicates Assignment, Duties, Responsibilities to include Geophysical Teams	□	□	□	
f. Procedures for Reporting and Disposition of MPPEH	□	□	□	
g. Procedures Established for Disposal of MEC in Populated/Sensitive Areas	□	□	□	

5. Technical Management (Continued)	**YES**	**NO**	**N/A**	**COMMENTS**
h. Procedures Established for Managing, Reporting, Venting and Disposing of munitions debris and range-related debris.	□	□	□	
i. Additional Task and Procedures being Followed (e.g., PAO, Community Relations, Weekly & Monthly Project Status Reports)	□	□	□	
j. Procedures Established for Recording, Reporting and Implementing Lessons Learned	□	□	□	
k. Limitations Posed and Ability of Detection System(s) Chosen	□	□	□	
l. Proper Use of Geophysical Detections Systems Used	□	□	□	
m. Procedures Established for Disposal of MEC in non-populated/non-sensitive areas	□	□	□	
6. Facilities. Reference EM 385-1-1	**YES**	**NO**	**N/A**	**COMMENTS**
a. Adequate Work Space & Facilities (Restrooms, etc.)	□	□	□	
b. Good Housekeeping (No Fire Hazards, Tripping Hazards, etc.)	□	□	□	
c. Approved and Suitable Containers for Flammable Toxic or Explosive Materials	□	□	□	
d. Approved/Adequate Explosive Storage Facilities	□	□	□	
e. Fire/Emergency Exits Clear & Unbarred	□	□	□	
f. Personnel Limits Maintained	□	□	□	
g. Site Security Adequate	□	□	□	

6. Facilities. Reference EM 385-1-1 (Continued)	**YES**	**NO**	**N/A**	**COMMENTS**
h. Toilets. EM 385-1-1, Section 2, Page 14, Paragraph 02.B Toilets	□	□	□	
i. Washing Facilities. EM 385-1-1, Section 2, Page 16, Paragraph 02.C Washing Facilities	□	□	□	
7. Equipment, Reference Approved WP/Manufacture Operators Manual	**YES**	**NO**	**N/A**	**COMMENTS**
a. Tools Appropriate and Serviceable	□	□	□	
b. Proper Personnel Protective Equipment (PPE) Present, Serviceable & Utilized	□	□	□	
c. Equipment Calibrated (Last Call Date _____ Next Call Date _____)	□	□	□	
d. Survey Equipment Inspected & Serviceable	□	□	□	
e. Heavy Equipment Inspected & Serviceable IAW EM 385-1-1, Section 16	□	□	□	
f. Are Equipped with at Least One Dry Chemical or CO2 Fire Extinguisher-Minimum rating of 5-BC – IAW EM 385-1-1, Section 16	□	□	□	
g. Two Separate Means of Communications, Radio(s) Cell Phone, Land Line(s)	□	□	□	
h. Geophysical Equipment On-Hand & Serviceable	□	□	□	

8. Explosive Storage Requirements. Reference EP 1110-1-18	**YES**	**NO**	**N/A**	**COMMENTS**
a. Proper Storage Containers Type 2 Magazines conforming to standards set forth in Section 55.206 of ATFP 5400.7, AFT Explosives Law and Regulations.	□	□	□	
b. Placards. Each magazine will display the placards required by Department of Transportation (DOT) regulations in accordance with DOD 6055.09-STD and Department of the Army Pamphlet (DA Pam) 385-64 for Hazard Division of MEC stored in the magazine.	□	□	□	
c. Explosive Compatibility Groups. Segregated into the appropriate hazard division/storage compatibility group criteria listed in Chapter 3, DOD 6055.09-STD.	□	□	□	
d. Physical Security. Contractor shall conduct and document physical security survey. The survey is to determine if fencing or guards are required.	□	□	□	
e. Locks. Shall meet the standards listed in Section 55.208 (a) (4), ATFP 5400.7.	□	□	□	
f. A key control system will be documented in the Work Plan, EP 1110-1-18.	□	□	□	

8. Explosive Storage Requirements. Reference EP 1110-1-18 (Continued)	**YES**	**NO**	**N/A**	**COMMENTS**
g. Lightning Protection. Magazine constructed of metal that has 3/16 inch steel or thicker in accordance with National Fire Protection Association (NFPA) 780.	□	□	□	
h. Lightning Protection. Magazine grounded in accordance with NFPA.	□	□	□	
i. Lightning Protection. Magazine is located at least 6.5 feet from the nearest fence.	□	□	□	
j. Lightning Protection. BRAC, IRP, FUDS and Active Installation will meet the provisions of DOD 6055.09-STD. Army installations will also meet the provisions of DA Pam 385-64.	□	□	□	
k. Fire Protection. Extinguishers of appropriate size (minimum 10 BC) and type will be located in all explosives storage facilities.	□	□	□	
l. Explosive Limits Maintained. .	□	□	□	
m. Waiver. MACOM approval for storage of commercial of explosives on-site (if required).	□	□	□	
9. Explosive Management Plan. Reference Approved WP/49 CFR	**YES**	**NO**	**N/A**	**COMMENTS**
a. Signature Authority On-Hand	□	□	□	
b. Periodic Inventories Conducted On-Schedule	□	□	□	

9. Explosive Management Plan. Reference Approved WP/49 CFR (Continued)	**YES**	**NO**	**N/A**	**COMMENTS**
c. Accountability Records Maintained	□	□	□	
d. Lost/Stolen Reporting Procedures in Place	□	□	□	
e. Final Disposition Procedures Documented	□	□	□	
f. Key Control/Security	□	□	□	
10. Transportation of MEC. Reference EP 1110-11-18. Chapter 15/49 CFR	**YES**	**NO**	**N/A**	**COMMENTS**
a. Hazardous Waste Manifest (EPA Form 8700-22) (if required)	□	□	□	
b. Hazard Classification of MEC IAW TB 700-2	□	□	□	
c. Training of Transporting MEC IAW 49 CFR, Part 172 & State Applicable State Requirements	□	□	□	
d. Documented Organizational Responsibilities for Transportation of MEC	□	□	□	
e. Approved Transportation Plan	□	□	□	
f. Pre-operational checks of vehicles being conducted	□	□	□	
g. All operators licensed for vehicle	□	□	□	
h. Fire Fighting & First Aid Equipment on board	□	□	□	
i. Cargo properly segregated/blocked and braced and in proper container	□	□	□	
j. Proper DOT Placards/Fire Fighting Symbols Used	□	□	□	

11. UXO Operational Plan, Reference Approved WP & EP 1110-1-18	**YES**	**NO**	**N/A**	**COMMENTS**
a. Contractor following methodology defined in WP	□	□	□	
(1) SUXOS conducted physical check prior to sweep operations	□	□	□	
(2) Daily Safety Meeting Conducted by SUXOS/SSHO	□	□	□	
b. Geophysical Detection/Magnetometer Used	□	□	□	
(1) Pre-Operational Checks Performed Prior to Sweep Operations	□	□	□	
(2) Operational Condition Annotated in Log Book	□	□	□	
(3) UXO Teams	□	□	□	
(4) Quality Control	□	□	□	
(5) Quality Assurance	□	□	□	
c. Operational Teams Operating IAW WP	□	□	□	
(1) UXO Supervisor Conducted Physical Check Prior to Sweep Operation	□	□	□	
(2) Pre-Sweep Operational/Safety Brief Conducted	□	□	□	
(3) Individual Sweep Lanes/Transects Marked IAW WP	□	□	□	
(4) Contacts Marked & Investigated Properly	□	□	□	
(5) Results of Sweep Operation Recorded	□	□	□	
(6) All MEC, Inert Items & Scrap Examined by at Least Two UXO Personnel	□	□	□	

11. UXO Operational Plan, Reference Approved WP & EP 1110-1-18 (Continued)	**YES**	**NO**	**N/A**	**COMMENTS**
(a) AEDA (Range Residue) IAW PWS/SOW and Properly Addressed in WP	□	□	□	
(7) All UXOs Clearly Marked	□	□	□	
d. QC Operations IAW WP	□	□	□	
e. Non-Munitions Debris Being Collected (as required)	□	□	□	
f. Munitions Debris Inspected/Vented/Segregated	□	□	□	
g. Geophysical Test Grids Appropriate and IAW PWS/SOW	□	□	□	
12. Disposal Operations Planned On-Site IAW the Approved WP	**YES**	**NO**	**N/A**	**COMMENTS**
a. Disposal Method IAW WP	□	□	□	
13. Location Survey & Mapping Plan. Reference Contract DIDs	**YES**	**NO**	**N/A**	**COMMENTS**
a. Professional Land Surveyor	□	□	□	
b. Surveyors Received Safety Briefing	□	□	□	
c. UXO Escort Provided	□	□	□	
d. Grid Stake, Locations Swept with Geophysical Equipment prior to Driving Stakes	□	□	□	
e. Survey Notes Being Recorded	□	□	□	
14. Quality Control Plan. Reference PWS/SOW/DID(s)	**YES**	**NO**	**N/A**	**COMMENTS**
a. QC Operational/Checks Being Conducted IAW WP	□	□	□	

14. Quality Control Plan. Reference PWS/SOW/DID(s) (continued)	**YES**	**NO**	**N/A**	**COMMENTS**
b. QC Grid/Transect Established IAW WP	□	□	□	
c. Results of QC Checks Being Recorded	□	□	□	
d. Pass/Fail Criteria Clearly Defined IAW PWS/SOW	□	□	□	
15. Vegetation Removal Reference WP/SSHP & OSHA Req.	**YES**	**NO**	**N/A**	**COMMENTS**
a. Vegetation Removal & Localized, if required	□	□	□	
b. Equipment Operation to Prevent Impact with Possible Surface UXO	□	□	□	
c. Cutting does not Present Impalement Hazard	□	□	□	
d. UXO Personnel Monitoring Cutting Operation	□	□	□	
e. UXO Discovered Marked/Handled Appropriately	□	□	□	
f. Equipment Being Operated Safely & IAW Equipment Operators Manual/WP	□	□	□	
16. Munition Constituents (MC) Sampling and Analysis Plan, if required	**YES**	**NO**	**N/A**	**COMMENTS**
a. Key Personnel Identified	□	□	□	
b. Quality Assurance Responsibilities Identified	□	□	□	
c. Procedures for Collection of Samples	□	□	□	
d. Local Carrier Location Identified	□	□	□	

BLANK

APPENDIX H

POINTS OF CONTACT

Contact	Telephone Number
20th Support Command APG, MD (for requesting EOD Support)	410-436-6333 (24 Hour Number)
22nd Chemical Battalion (TE) (TE Operations, APG, MD)	410-436-8524/8534
Chemical Weapons Design Center (for reporting chemical events-USACE)	256-895-1290 (Duty Hours) 256-895-1180 (Security Guards at CEHNC After Duty Hours)
Army Operations Center	703-697-0218
USACE Emergency Operations Center Washington, DC	202-761-1001

BLANK

Appendix I

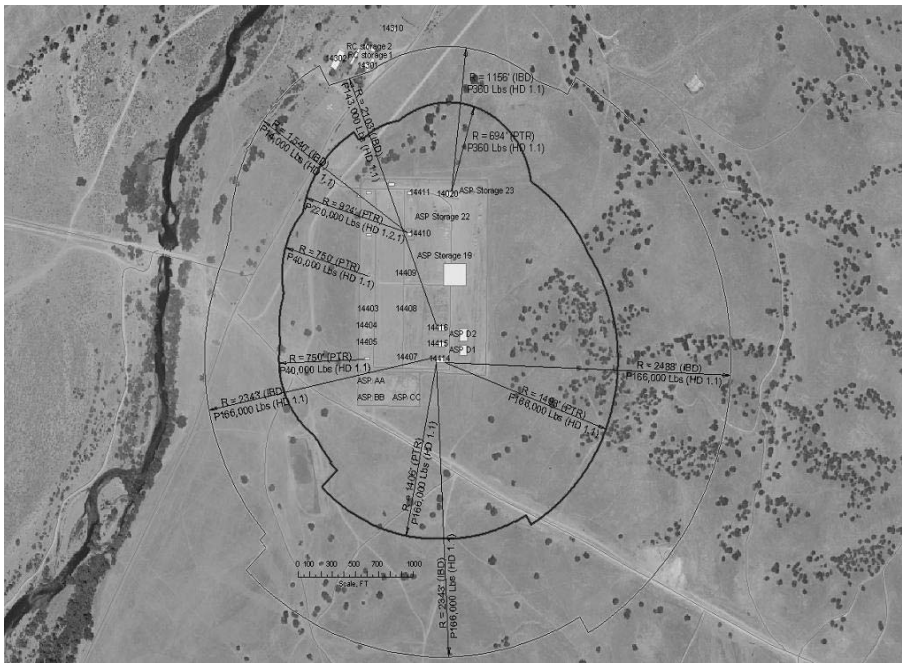
EXPLOSIVES SAFETY SITE PLAN
QD WORKSHEET

SECTION I - GENERAL INFORMATION										
INSTALLATION:			LOCATION:						DATE:	
SECTION II - POTENTIAL EXPLOSION SITE (PES) DATA										
PES INFORMATION										
FAC #	FACILITY DESCRIPTION	OWNING COMMAND OR UNIT	RQD IBD	RQD PTR	1.1	1.2.1 MCE	1.2.2	( ) 1.2.3 MCE	1.3	1.4
Remarks:										
Section III – Most Limiting Exposed Sites (ES) for this PES										
IBD										
FAC #	FACILITY DESCRIPTION	OWNING COMMAND OR UNIT	DIST ACT	DIST RQD	1.1	1.2.1 MCE	1.2.2	( ) 1.2.3 MCE	1.3	1.4
(facility name, ECM, etc.) (construction) (drawing numbers) (dimensions) (operation description)										
PTR										
FAC #	FACILITY DESCRIPTION	OWNING COMMAND OR UNIT	DIST ACT	DIST RQD	1.1	1.2.1 MCE	1.2.2	( ) 1.2.3 MCE	1.3	1.4
(facility name, ECM, etc.) (construction) (drawing numbers) (dimensions) (operation description)										
ILD										
FAC #	FACILITY DESCRIPTION	OWNING COMMAND OR UNIT	DIST ACT	DIST RQD	1.1	1.2.1 MCE	1.2.2	( ) 1.2.3 MCE	1.3	1.4
(facility name, ECM, etc.) (construction) (drawing numbers) (dimensions) (operation description)										
IMD										
FAC #	FACILITY DESCRIPTION	OWNING COMMAND OR UNIT	DIST ACT	DIST RQD	1.1	1.2.1 MCE	1.2.2	( ) 1.2.3 MCE	1.3	1.4
(facility name, ECM, etc.) (construction) (drawing numbers) (dimensions) (operation description)										

BLANK

APPENDIX J

SAMPLE EXPLOSIVES SAFETY SITING MAP



BLANK

BLANK

APPENDIX K

QUALITY ASSURANCE REPORT (QAR) FORMAT

USACE ORDNANCE AND EXPLOSIVE PROJECT QUALITY ASSURANCE REPORT

CONTRACT WITH DELIVERY ORDER:

SITE:

DATE:

TELEPHONE NUMBER:

FAX NUMBER:

WEATHER:

USACE UXO SME:

GRIDS COMPLETED BY CONTRACTOR:

QA CHECKS CONDUCTED:

GRIDS THAT PASSED QA INSPECTION:

CORRECTIVE ACTION REQUEST:

CONTRACTOR PERSONNEL ON-SITE: *Total Number on-site*

*****Not On-Site Today

GENERAL OBSERVATIONS:

LESSONS LEARNED:

DISTRIBUTION:

APPENDIX L

ABBREVIATED SITE SAFETY AND HEALTH PLAN (ASSHP) FORMAT (NON-INTRUSIVE ACTIVITIES)

Site Name: _____

Version: [ ] Original [ ] Revision/Date: _____

Prepared by:_____

Affiliation:_____

Address/Phone: _____

Signature/Date:_____

Reviewer Signature/Date: _____

Title/Affiliation: _____

Reviewer Signature/Date: _____

Title/Affiliation: _____

Team Leader/UXOSO: _____

Title/Affiliation: _____

Signature/Date:_____

L-1. Site Description and Contamination Characterization.

a. Site Description

SITE LOCATION	APPROXIMATE SIZE
TOPOGRAPHY	**SITE USES**
( )Forested ( )Open Terrain ( )Lake, Pond ( )Wetland ( )Grassland ( ) Arid ( )Hilly ( )Tillage ( )Other	( )Rural ( )Urban ( )Ag Business ( )Commercial ( )Farming ( )Industrial ( )Ranching ( )Mining ( )Military ( )Residential ( )Government ( )Recreational ( )Other

b. Contamination Characterization

CHEMICAL CONTAMINANT LISTING		
Contaminant	Location	Concentration

ORDNANCE/EXPLOSIVES CONTAMINATION			
Type	Amount	Location	Surface/ Subsurface

L-2. Hazard/Risk Analysis.

a. Tasks to be performed:

Task #:
_____

Task #:
_____

Task #:
_____

Task #	HAZARDS: Safety, Chemical, Physical, Radiological, Biological, OE (*See Below)	ACTION LEVELS: (**See Below)

Notes to Hazard/Risk Analysis:

***HAZARDS:**

Safety:
Structural: (e.g. sagging roof or floor, broken or missing stairs, railings, floor boards, leaning or deteriorated load bearing walls/support beams, etc.)

Falling: (e.g. open pits; manholes; silos; wells; shafts; rocks; steep inclines; wet surfaces; etc.) Climbing: (e.g. falls from structures > 4 feet; deteriorated ladders or missing rungs; etc.)
Walking or Debris: (e.g. Uneven terrain; animal burrows; surface indentations; exposed nails; broken timbers; sharp protruding objects; broken glass; etc.)

Confined Space (e.g. excavations > 4 feet deep; surface/underground utility vaults; vats/silos/grain bins; open surface tanks/cisterns/septic tanks; cellars/crawl spaces; tunnels; wells; boilers; underground/above ground storage tanks; etc.)(NO ENTRY)

Eye Hazards: (e.g. Thicket branches; airborne dust/windy conditions; contaminated liquid splashes; etc.) OE/Other: (e.g. explosives; combustible or flammable materials; oxygen deficiency; etc.)

Chemical:
Evaluate the chemical hazards that may be encountered during site activities for each task. For activities utilizing this plan, encounters with chemicals above the PEL, TLV or the IDLH are not expected. THIS PLAN SHALL NOT BE USED IF OVEREXPOSURES OR IDLH CONDITIONS ARE EXPECTED.

(List the chemical TLV/PEL/REL; OSHA/NIOSH IDLH; odor threshold/warning levels; warning signs/symptoms of overexposure; concentrations expected on site.)

Physical:
Evaluate the potential for injury from physical agents such as noise, electricity, moving parts/machinery, heat and cold stress that may be present (e.g. loud machinery; overhead or underground power lines; personal protective clothing, etc.)

Radiological:
Evaluate the risk to human health caused by radioactive materials or ionizing radiation fields in the area where work is to be performed. Do not use this Generic SSHP if a qualified health physicist determines that worker exposure is likely to exceed exposure levels

considered acceptable for the general public.

Biological:
Evaluate the potential for illness of injury due to biological agents (e.g. poisonous plants, animals, insects, microorganisms, medical waste, etc.)

OE:
Evaluate exposure; minimize people, time, and amount of hazardous material. Age or condition of ordnance DOES NOT decrease hazard.

Presence of GREEN MARKINGS indicates chemical filler: EVACUATE IMMEDIATELY.

Ordnance exposed to fire EXTREMELY hazardous: EVACUATE IMMEDIATELY.

****ACTION LEVELS:**
Action Levels shall typically be defined as requiring site evacuation only if significant hazards are encountered.

Note: The non-intrusive activities for which this abbreviated SSHP is designed, will not typically encounter ordnance, chemical contaminant, or radioactive exposures above background. In the event that chemical or radioactive exposures which are judged to be significant are encountered (reasonable potential to exceed permissible exposure limits or encounter IDLH conditions, or where OE is expected) this plan requires evacuation of the site, reevaluation, and development of a SSHP by the Qualified Industrial Hygienist/Safety Personnel which addresses the potential overexposures.

L-3. Staff Organization, Qualifications, and Responsibilities

TITLE	NAME	RESPONSIBILITY	PHONE NO.
Qualified IH/SP		Plan Approval	
Proj. Manager			
Team Lead /UXOSO		On-site SOH Authority	
CPR/First Aid			
CPR/First Aid			
Physician			

L-4. Training.

NAME	TYPE: 40hr/ref./supv.	PPE	SITE HAZARD

L-5. Personal Proective Equipment.

a. Personal Protective Equipment (PPE) Program:

- PPE Selection: Level D
- PPE Use and Equipment Limitations: No known atmospheric hazard; work tasks preclude splashes, immersion and potential for unexpected inhalation/contact with chemical hazards.
- Work Mission Duration: Team Leader/UXOSO Instructions
- PPE Maintenance and Storage: Team Leader/UXOSO Instructions
- PPE Decontamination and Disposal: Team Leader/UXOSO Instructions
- PPE Training/Fitting: Team Leader/UXOSO Instructions
- PPE Donning and Doffing: Manufacturer's Instructions
- PPE Inspection: Team Leader/UXOSO Instructions
- PPE Program Effectiveness: N/A; Level D only
- PPE Temperature Limitations: Impermeable work clothing may cause heat stress. ***> See paragraph 9, this SSHP.***

b. Levels of Protection/Task:

Level D: A standard work uniform affording minimal protection, used for nuisance contamination only. The following constitute Level D equipment; it shall be used as specified below. (29 CFR 1910.120, appendix A.)

- Coveralls (optional)
- Gloves (optional)
- Boots/shoes, Chemical-resistant steel toe and shank
- Boots, outer, chemical-resistant, disposable (optional)
- Safety glasses or chemical splash goggles
- Hard hat (optional)
- Escape masks (optional)
- Face shield (optional)
- Disposable Work Clothing (optional)

TASK #	PPE

L-6. Medical Surveillance.

a. Medical surveillance program employee participation certification:

NAME	EXAM DATE

L-7. Dosimetry.

a. Safety and health issues involving employees working within a radiologically restricted area or activities that will generate worker exposure in excess of what is considered acceptable to the general public are beyond the scope of this SSHP.

b. Radiation dosimetry: N/A

c. Employee radiation exposure history: N/A

d. Internal radioactive contamination exposure hazards are beyond the scope of this SSHP.

e. Reports of Exposure to Ionizing Radiation: N/A

L-8. Exposure Monitoring/Air Sampling Program.

a. Air Monitoring/Air Sampling: (See preamble)

b. Real-time Screening for Ionizing Radiation: (See preamble)

c. Sampling and analytical methods: N/A

d. Sample analysis laboratories: N/A

e. Meteorological data: N/A

f. Noise monitoring: N/A

g. Monitoring/sampling results: N/A

h. Exposure monitoring records: N/A

L-9. Heat/Cold Stress Monitoring.

The buddy system or appropriate monitoring procedures shall be used to observe heat stress symptoms. Arrangements shall be made to provide access to plain cool potable water.

L-10. Standing Operating Safety Procedures, Engineering Controls and Work Practices.

a. Site rules/prohibitions: Use buddy system (exception: preliminary assessments of eligibility-but still recommended); no eating/drinking/smoking.

b. Work permit requirements: None. [e.g. No radioactive work, excavation, hot work, confined space, etc.]

c. Material handling procedures: Do not handle soils, liquids, radioactive materials.

d. Drum/container handling procedures and precautions: Do not

open, sample or overpack.

e. Confined space entry procedures: Avoid/Do not enter.

f. Hot work, sources of ignition, fire protection/ prevention, and electrical safety: Avoid all electrical hazards, no smoking, avoid spark producing objects.

g. Excavation and trench safety: Avoid/Do not enter.

h. Guarding of machinery and equipment: Do not operate/avoid all physical contact.

i. Lockout/Tagout: N/A

j. Fall protection: No structural climbing, avoid potential areas where fall through could occur.

k. Hazard Communication: N/A

l. Illumination: Daylight hours only; flash light optional.

m. Sanitation: Use on-site/off-site facilities.

n. Engineering controls: N/A

o. Process Systems Safety: N/A

p. Signs and labels: N/A

q. Ordnance/Explosives Site work practices:

(1) Do not touch or move any ordnance items regardless of the marking or apparent condition.

(2) Do not visit an ordnance site if an electrical storm is occurring or approaching. If a storm approaches during a site visit leave the site immediately and seek shelter.

(3) Do not use radio or cellular phones in the vicinity of suspect ordnance items.

(4) Do not walk across an area where the ground cannot be seen. If dead vegetation or animals are observed, leave the area immediately due to the potential contamination of chemical agent.

(5) Do not drive vehicles into a suspected OE area; use clearly marked lanes.

(6) Do not carry matches, cigarettes, lighters or other flame producing devices into an OE site.

(7) Do not rely on color code for positive identification of ordnance items or their contents.

(8) If necessary, approach ordnance items from the side, avoid approaching the front and rear areas.

(9) Always assume ordnance items contain a live charge until it can be determined otherwise.

SPECIFIC ACTIONS TO BE TAKEN UPON LOCATING ORDNANCE

(1) Do not be misled by markings on the ordnance item stating practice bomb, a dummy or inert. Even practice bombs have explosive charges that are used to mark/spot the point of impact; or the item could be mismarked.

(2) Do not roll the item over or scrape the item to identify the markings.

(3) The location of any ordnance items found during site investigation should be clearly marked so it can be easily located and avoided.

(4) Upon locating any OE, notify USAESCH at (256) 895-1582 during office hours, (central time). If after hours, notify USAESCH at

(256) 895-1180.

L-11. Site Control Measures.

a. Work zones and access points.

b. Site map delineating work zones (attached as appropriate).

c. Ionizing radiation restricted areas.

d. On-site and off-site communications:

(1) On-site Communication: Oral with a contingency for hand signals, or on-site cellular phone / FM two way radio (in the absence of suspected ordnance).

(2) Off-site Communication (Either on-site cellular phone / FM two way radio (in the absence of suspected ordnance) or specified readily accessible on/off-site public or private phone):

e. Site security (physical and procedural) description:

(1) Physical Site Security.

(2) Procedural Site Security.

f. General site access description:

_____
_____
_____
_____

L-12. Personal Hygiene and Decontamination.

a. Necessary facilities and their locations.

b. Decontamination SOPs: N/A

L-13. Equipment Decontamination.

a. Decontamination facilities/locations: N/A

b. Decontamination procedures: N/A

L-14. Emergency Equipment and First Aid Requirements.

a. First aid equipment and supplies: As specified:

b. Emergency eye washes/showers: N/A

c. Emergency-use respirators: N/A

d. Spill control materials and equipment: N/A

e. Fire extinguishers: As specified according to size, type, and location:

L-15. Emergency Response and Contingency Procedures (On-Site and Off-site).

a. Local fire/police/rescue pre-notification:

b. Emergency Response Plan:

(1) Pre-emergency planning and procedures for reporting incidents to appropriate government agencies: As specified and prearranged by the UXOSO.

(2) Personnel roles, lines of authority, communications:

(a) Personnel roles (See Paragraph 3):

(b) Lines of Authority (See Paragraph 3):

(c) Communications (See Paragraph 1 1.d):

(3) Posted instructions (attach route map) and list of emergency

contacts:

(a) Project Manager (See Paragraph 3).

(b) Qualified Industrial Hygienist (See Paragraph 3).

(c) Qualified Safety Personnel (See Paragraph 3).

(d) Nearest Medical Facility.

(e) Ambulance.

(f) Police.

(g) ire.

(h) Poison Control Center.

(i) State/Local Emergency Response Centers.

(j) National Response Center (by U.S. Coast Guard).

(4) Emergency recognition and prevention: The site shall be evacuated in the event significant unexpected hazards are encountered which cannot be safely documented from an appropriate safe distance.

(5) Site topography, layout, and prevailing weather conditions:

(a) Site Topography (See Paragraph 1.a).

(b) Layout.

(c) Prevailing Weather Conditions.

(6) Criteria and procedures for site evacuation (emergency alerting procedures/employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

(a) Emergency Alerting Procedures/Alarm System: Oral Communication for small groups; emergency signals for large groups (e.g. air horns) as specified by the UXOSO.

(b) Emergency PPE and Equipment (See Paragraph 14).

(c) Safe Distances: As specified by the UXOSO.

(d) Places of Refuge: As specified by the UXOSO.

(e) Evacuation Routes (See route map): As specified by the UXOSO.

(f) Site Security and Control(See Paragraph 11): As specified by the UXOSO.

(7) Specific procedures for decontamination and medical treatment of injured personnel.

(8) Route maps to nearest pre-notified medical facility: See attached; as specified by the UXOSO.

(9) Criteria for initiating community alert program, contacts and responsibilities: N/A.

(10) Critique of emergency responses and follow-up:
c. 29 CFR 1910.38(a) applicability: See Paragraph 15.b.

L-16. Accident Prevention.

a. Additional Accident Prevention Plan topics required by EM 385-1-1 which are not specifically covered in this appendix, shall be addressed as follows:

L-17. Logs, Reports, and Record Keeping.

a. The records may include the following:

(1) Daily safety inspection logs (may be part of the Daily QC Reports): N/A

(2) Equipment maintenance logs: N/A

(3) Environmental and personal exposure monitoring/ sampling results: N/A

(4) Records of radiation surveys, monitoring and disposal as per 10 CFR 20 subpart L: N/A

SAFETY BRIEFING CHECKLIST/SSHP ACCEPTANCE FORM

SITE NAME:_____ DATE/TIME:_____

GENERAL INFORMATION

_____ Purpose of Visit

_____ Key Site Personnel/Responsibilities

_____ Training & Medical Requirements

SITE-SPECIFIC INFORMATION

_____ Site Description/Characterization/Past Uses

_____ Previous Studies/History

_____ Contaminant Characterization

_____ Potential Site Hazards/Health Effects

_____ OE Safety Procedures

_____ Site Personal Protective Equipment(PPE) Program

_____ Site SOPs

_____ Site Control Measures, Decontamination and Communications

_____ Emergency Equipment

_____ Emergency Response/Phone Numbers/Nearest Medical Facility

_____ Unanticipated hazardous conditions shall result in ceasing activities and evacuation of the site in accordance with instructions from the UXOSO.

PLAN ACCEPTANCE

I, the undersigned, have read and have been verbally briefed on the topics noted above and in the SSHP; I understand the SSHP and agree to comply with all the indicated safety and health requirements:

PRINTED NAME	ORGANIZATION	SIGNATURE	DATE
Safety Briefing Presenter		Signature	Date

BLANK

APPENDIX M

EXPLOSIVES SAFETY STANDARDS QD RELATIONSHIPS

Magazine From To	Loading Dock in Storage Area	Surveillance Building	Holding Yard	Class/Inter Yard	Pack & Ship Building	Operating Building Line 1	Service Magazine Line 1	Loading Dock Line 1	Operating Building Line 2	Service Magazine Line 2	Loading Dock Line 2	
Magazine	IMD	IMD	IMD	IMD	2	IMD	IMD	IMD	IMD	IMD	IMD	IMD
Loading Dock (in storage area)	IMD	IMD	IMD	IMD	2	IMD	IMD	IMD	IMD	IMD	IMD	IMD
Surveillance Building	IL1	IL1	IL1	IL1	2	IL1	IL1	IL1	IL1	IL1	IL1	IL1
Holding Yard	IMD	IMD	IMD	IMD	2	IMD	IMD	IMD	IMD	IMD	IMD	IMD
Class/Inter Yard	IMD	IMD	IMD	IMD	2	IMD	IMD	IMD	IMD	IMD	IMD	IMD
Pack/Ship Bldg	IL1	IL1	IL1	IL1	2	IL1	IL1	IL1	IL1	IL1	IL1	IL1
Operating Building Line 1	IBD5	IBD5	IL1	IBD5	2	IL1	IL	IL	IL	IBD4	IBD4	IBD4
Service Magazine Line 1	IBD5	IBD5	IL1	IBD5	2	IL1	2	IMD	IL	IBD4	IBD4	IBD4
Loading Dock Line 1	IBD5	IBD5	IL1	IBD5	2	IL1	IL	IL	IL	IBD4	IBD4	IBD4
Lunchroom/Change House Line 1	IBD5	IBD5	IL1	IBD5	2	IL1	IL	IL	IL	IBD4	IBD4	IBD4
Operating Building Line 2	IBD5	IBD5	IL1	IBD5	2	IL1	IBD4	IBD4	IBD4	IL	IL	IL
Service Magazine Line 2	IBD5	IBD5	IL1	IBD5	2	IL1	IBD4	IBD4	IBD4	2	IMD	IL
Loading Dock Line 2	IBD5	IBD5	IL1	IBD5	2	IL1	IBD4	IBD4	IBD4	IL	IL	IL
Lunchroom/Change House Line 2	IBD5	IBD5	IL1	IBD5	2	IL1	IBD4	IBD4	IBD4	IL	IL	IL

Magazine From To	Loading Dock in Storage Area	Surveillance Building	Holding Yard	Class/Inter Yard	Pack & Ship Building	Operating Building Line 1	Service Magazine Line 1	Loading Dock Line 1	Operating Building Line 2	Service Magazine Line 2	Loading Dock Line 2	
Field Office in Ammo Area	IL1	IL1	IL1	IL1	2	IL1	IL1	IL1	IL1	IL1	IL1	IL1
Administrative Areas	IBD	IBD	IBD	IBD	2	IBD	IBD	IBD	IBD	IBD	IBD	IBD
Installation Boundaries	IBD	IBD	IBD	IBD	2	IBD	IBD	IBD	IBD	IBD	IBD	IBD
Public Highway & Passenger Rail	PTR	PTR	PTR	PTR	2	PTR	PTR	PTR	PTR	PTR	PTR	PTR
Recreational Area	PTR3	PTR3	PTR3	PTR3	2	PTR3	PTR3	PTR3	PTR3	PTR3	PTR3	PTR3
Commercial Waterway	PTR	PTR	PTR	PTR	2	PTR	PTR	PTR	PTR	PTR	PTR	PTR

1. IF the PES contains 1.1, use unbarricaded intraline distance (K18) even if a barricade is present.

2. Not considered a PES for the particular PES/ES relationship specified. No QD provisions apply.

3. IBD applies if structures (for example, bleachers) are present.

4. Intraline distance (K18) may be used if the parallel operating lines are engaged in similar operations and the AE at each present similar hazards. Otherwise, IBD (blast only) applies.

5. IBD, blast only applies.

APPENDIX N

GLASS HAZARD RISK ASSESSMENT FORM AND MEMORANDUM FOR RECORD

N.01 STEP ONE: IDENTIFY THE RISK

N.01.01 Identify the potential explosives site (PES).

N.01.01.01 Site construction. Open, concrete building, reinforced masonry, etc.

N.01.01.02 Net explosives weight (NEW) the PES is sited for. The NEW normally expected at the site.

N.01.01.03 Operation conducted at the PES.

N.01.01.04 Frequency of operation at the PES.

N.01.01.05 Additional considerations (Factors that may increase the risk) – Supporting troop deployments during war or contingencies, performed by TDY personnel, operations conducted at night, weekends, etc.

N.01.02 Look out from the PES, identify every building in the inhabited building distance (IBD) arc.

N.01.02.01 Building ID.

N.01.02.02 Distance from PES.

N.01.02.03 Occupied? Number of personnel at the exposed site (ES). If not occupied no further action is required, merely state that the building is not inhabited.

N.01.02.04 Type of occupancy? Admin Personnel? Ammo Workers? etc.

N.01.02.05 Duration of personnel exposure.

N.01.02.06 Is glass present? If so, type of glass. Percentage of glass surface to the entire exposed wall surface.

N.01.02.07 Mitigating measures to reduce the glass hazard.

N.01.03 Continue to look out from the PES, identify every building between IBD and K88 (approximately twice IBD) arc.

N.01.03.01 Building ID.

N.01.03.02 Distance from PES.

N.01.03.03 Occupied? Number of personnel at the exposed site (ES). If not occupied no further action is required, merely state that the building is not occupied.

N.01.03.04 Type of occupancy? Admin Personnel? Ammo Workers? etc.

N.01.03.05 Duration of personnel exposure.

N.01.03.06 Is glass present? If so type of glass. Percentage of glass surface to the entire exposed wall surface.

N.01.03.07 Mitigating measures to reduce the glass hazard.

N.01.03.08 Note: Current policy only requires a review on the installation. A review of off post exposures is recommended but is not required by current Army policy. Are the exposures off-post? If so, how many people off-post are exposed?

N.01.04 Look back to the structure in question from other explosives facilities.

N.01.04.01 Building ID.

N.01.04.02 Distance from PESs out to K88.

N.01.04.03 Occupied? If not normally occupied no further action is required, merely state that the site is not occupied.

N.01.04.04 Type of occupancy? Admin personnel? Ammo workers? Troops in training, etc.

N.01.04.05 Duration of personnel exposure.

N.01.04.06 Is glass present? If so, what type of glass. Percentage of glass surface to the entire exposed wall surface.

N.01.04.07 Mitigating measures to reduce the glass hazard

N.02 STEP TWO: ASSESS THE HAZARDS

N.02.01 For new construction, have all alternative locations been considered? List alternative locations and the reason why they were not chosen.

N.02.02 Have reduced NEW been considered? If not, list reasons for not reducing NEW.

N.02.03 Have alternate operating times been considered when fewer personnel are exposed?

N.02.04 Potential number of injured exposed personnel.

N.03 STEP THREE: DEVELOP CONTROLS AND RISK DECISIONS

N.03.01 Safety Office concurrence or non-concurrence with the risk assessment.

N.03.02 Chain of Command’s signed and dated acceptance of the risk.

N.04 STEP FOUR: IMPLEMENT CONTROLS

N.04.01 Implement controls identified and accepted in Step Two. Examples:

N.04.01.01 Remove Windows.

N.04.01.02 Replace windows with Blast Resistant Glass and Reinforce window frames.

N.04.01.03 Add blast resistant window glaze.

N.04.01.04 Heavy curtains.

N.05 STEP FIVE: SUPERVISE AND EVALUATE. A sample of written acknowledgement is on the next page.

Sample Memorandum for Glass Hazard Risk

OFFICE SYMBOL
DATE

MEMORANDUM FOR RECORD

SUBJECT: Glass Hazards Risk Assessment

1. I have reviewed the comprehensive risk assessment prepared by my Safety Staff, and acknowledge the risk to personnel within the Inhabited Building Distance (IBD) arc from broken glass and projected glass due to an explosives event.

2. A corrective action plan (***has/has not***) been developed to mitigate hazards to personnel from potential glass shards.

3. A copy of this memorandum and the comprehensive risk assessment will be maintained with the explosives safety site plan as part of the permanent record.

4 . The POC is (***Installation Safety Manager or Unit Safety Officer***), **telephone number, email address.**

Signature
Installation/Garrison Commander and/or
Affected Mission Commander

BLANK

APPENDIX O

SAMPLE SITE PLAN SUBMISSION

The following is a sample of correspondence transmitting a fictitious ESSP for a GOLAN 10 Protectainer from the originating organization THROUGH supporting MSC, DRU, ASCC, or ACOM to USATCES. This ESSP has its own peculiarities and will require adaptation of the examples; using this template will assure a more expeditious review and approval.

Font Change data blocks require an entry by the submitting organization (such as date, name, activity). *Italics* data blocks require an action to be completed (for example, describe the mission, list all exposed sites). If the data block does not apply to the situation, delete or modify. Add all comments that are pertinent to your ESSP. Pictures of the site, maps, and additional information should be added as enclosures if needed to provide details.

Office Symbol
Date

MEMORANDUM FOR **Next Level in the Chain of Command, e.g., MSC, DRU, ASCC, or ACOM**

SUBJECT: Request for Explosives Site Plan Approval for a GOLAN 10 Protectainer at **Activity, Place**.

1. References:

a. DOD 6055.09-STD, DOD Ammunition and Explosives Safety Standards, February 29, 2008

b. AR 385-10, The Army Safety Program, 23 September 2007.

c. DA PAM 385-64, Ammunition and Explosives Safety Standards, 28 November 1997, and change 1, 15 December 1999.

d. DA PAM 385-65, Explosive and Chemical Site Plan Development and Submission, 1 February 2008.

e. Explosives Safety Site Plan Developer's Guide, US Army Technical Center for Explosives Safety, May 2008.

f. Memorandum, Department of Defense Safety Board, DDESB-KT, subject: Approval of Amended GOLAN 10 Protectainer Explosives Safety Parameters, 9 June 2004.

2. This explosives safety site plan has been reviewed against the criteria of the above references. Request final Army approval and forward to DDESB for review and approval. Approval of this site plan is requested by **DATE**. *If site plan approval is needed quickly, include justification (see paragraph IV.D.02.b(2) and Appendix R).*

3. *Describe the ammunition and explosives (AE) mission that will be conducted.*

4. The requested net explosive weight (NEW) limit is 23 pounds (10.4 kilograms) hazard division (HD) 1.1 or 1.2 (diameters < 1.6 inches (40mm)) or 1.3 or 50 pounds NEW of HD 1.4. **Shaped charges cannot be stored within the GOLAN 10.**

5. The following comments are provided:

a. The inhabited building distance (IBD), public traffic route (PTR) distance, and intraline distance (IDL) is 3 feet. The nearest inhabited building is located ____ feet (___ meters) from the GOLAN 10,

b. *List the potential explosion sites (PES) that project quantity distance (QD) arcs back over the GOLAN 10 or state that no PES projects QD arcs over the GOLAN 10.*

c. A site map is located at enclosure 1. Distances between the GOLAN 10 and facilities in the vicinity are annotated on the map. *List all exposed sites (ES) in the vicinity (100 feet) of the GOLAN 10*.

d. The GOLAN 10 will be oriented with the door facing away from nearby inhabited buildings or workspaces.

e. Explosives must be stored at least 23 inches (stand-off) from any interior wall of the GOLAN 10. Positive design features are in place to ensure stand-off distance is met.

f. Storage of the explosives permitted at the GOLAN 10 is the only activity authorized in the GOLAN 10 and its immediate vicinity. Any other operation (unpack, breakdown, inspection, etc.) will be IAW DDESB approved criteria or conducted at an approved surveillance facility.

g. The container’s integrity must be maintained to provide the IBD protection of 3 feet. Installations of alarms/electrical systems or modifications such as drilling or welding which will negate the protective features of the GOLAN 10 are not authorized.

h. The container will be grounded. Fences closer than 6 feet from the container will be bonded to the container.

i. The GOLAN 10 is located in the open, and the venting pressure and by-products will not present a risk to personnel. *If the GOLAN 10 is located inside a facility, explain how the pressure and by-products are vented to the outside … include the analysis (capability of withstanding the pressure load) of the vent system.*

j. The GOLAN 10 will be labeled on the exterior near the door. The label will read “USE FOR NON-FRAGMENTING AND DDESB APPROVED FRAGMENTING MUNITIONS ONLY”.

k. In the event of an internal explosion, the installation acknowledges that the GOLAN 10 must be inspected and re-certified prior to reuse.

l. *Detail any special measures (i.e. IDS, camera, fences) used for security.*

m. *Additional comments.*

6. Master planning maps will be updated to reflect the approved explosive QD arcs.

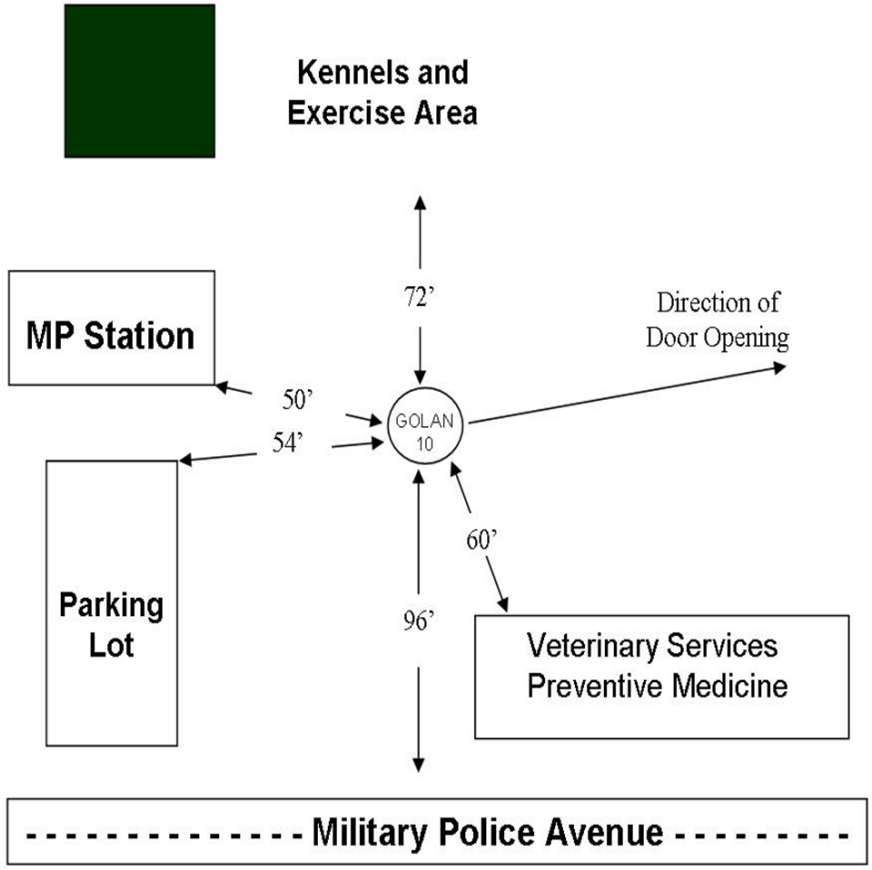
7. Point of contact is **NAME, Phone (DSN and Commercial)**, and **EMAIL**.

Encls **SIGNATURE BLOCK**

Encl 1 to GOLAN 10 Site Plan

FIGURE O-1
SAMPLE SITE MAP OF AREA

- Use either scaled distance or measured distances.
- If other potential explosion sites (PES) project arcs over the GOLAN, they must be shown on the map.



BLANK

APPENDIX P

EXPLOSIVES SITE PLAN CONTENT

MRS Investigation or Characterization. An explosives or, when appropriate, a CWM site plan is required for MRS investigations or characterizations that involve intentional physical contact with MEC or CA, regardless of CA configuration. Such site plans will address areas (e.g., magazines) used for the storage of commercial or military demolition explosives, MEC or CA, regardless of CA configuration; planned or established demolition or disposal areas; and the MRA, MRS, or response area boundaries. ***> See Appendix V, V.01.03.07.*** MRS investigation and characterization are used to collect the information needed to design the required munitions response and to prepare, as appropriate, an ESS or CSS for the selected response.

BLANK

APPENDIX Q

SAMPLE MEMORANDUM FOR SITE PLAN SUBMISSION

OFFICE SYMBOL DATE

MEMORANDUM FOR **Next Level in the Chain of Command, *(e.g., District-Division-HNC(DRU Authority)-USATCES or installation level-MSC, DRU, ASCC, or ACOM)***

SUBJECT: Request for ***(Preliminary or Final)*** Site Plan Approval for (**Installation and w*hat is being sited, e.g. Fort Dix, Ammunition Supply Point (ASP), Aboveground Magazines (AGM) A100 through A104, project #)***

1. References:

a. DOD 6055.09-STD, DOD Ammunition and Explosives Safety Standards.

b. AR 385-10, The Army Safety Program.

c. DA PAM 385-64, Ammunition and Explosives Safety Standards.

d. DA PAM 385-65, Explosive and Chemical Site Plan Development and Submission.

e. EM 385-1-97, Explosives Safety and Health requirements Manual. *(For USACE Submissions only)*

2. This office has reviewed the ESSP and this Memorandum constitutes *(District, Division, installation DRU, ACOM or ASCC)* approval.
(per paragraph 1.e, add at the end of this sentence "per reference 1.e." if submittal is to USATCES)

3. The subject site plan submission requests Army and DDESB approval for (***Location and all Facilities being sited***) located at (***Installation***), (***State***).

4. The site plan has been prepared in accordance with references 1.a through 1.e *(reference paragraph 1.e if submitting to USATCES)* above. Applicable information is found in TABs B through K of this submission.

5. Site plan approval is requested by (***Date***).

NOTE: If expedited site plan approval is requested (Less than 90 days from receipt at USATCES) then the expedited justification in TAB B must be completed, approved by the Garrison Commander, and endorsed by the installation command's Command Group.

6. The POC for the site plan submission is (**name, phone and email)**.

Signature
Chain of Command

CF:

APPENDIX R

EXPEDITE REVIEW REQUEST

1. We are requesting expedited review and approval of this site plan.

2. Requested Approval Date: Date which the installation would like DDESB approval by.

3. Proposed Contract Award Date:

4. Reason(s) expedited review is required: Detailed reasons why the site plan must receive expedited review and approval. This must include impacts if not approved by the date above, fiscal impacts, etc.

5. Reasons for not forwarding the site plan in time for routine submission: This must include when the project initial concept date, dates of all actions concerning the project, if it is an MCA project, why DDESB site plan approval was not accomplished earlier IAW Army master planning regulations.

6. Explanation of delays in the review and forwarding of the site plan through the chain of command: This includes not only delays at the installation level, but also those delays that occur at every level of the review chain of command.

7. Steps being taken by the Command to reduce or eliminate expedited requests: This element is to be completed by the installation's Command and must be included in the expedited request.

Approved/Disapproved:

SIGNATURE
District Commander, Installation or Garrison Commander

Concur/Non-Concur:

SIGNATURE
Command Group Representative
Intermediate Review Command

APPENDIX S

SAMPLE MEMORANDUM FOR ACCEPTANCE OF RISK

OFFICE SYMBOL DATE
DATE

MEMORANDUM FOR RECORD

SUBJECT: Acceptance of the Risk and Loss of Assets Due to Inadequate Lightning Protection

1. I have reviewed the comprehensive risk assessment prepared by my Safety Staff, and acknowledge the risk of not having an adequate Lightning Protection System (LPS). I accept the possible loss of (project/facility) and all its contents should it be struck by lightning.

2. The installation has a lightning warning system or capability to provide advanced warning of an approaching electrical storm. As part of this risk acceptance, personnel will cease operations and evacuate to Inhabited Building Distance (IBD) upon notification of an approaching thunderstorm. Personnel will not return to work until the storm has passed and the possibility of a lightning strike has ended.

3. A corrective action plan (has/has not) been developed to eliminate the LPS deficiency at (project/facility).

4. A copy of this memorandum and the comprehensive risk assessment will be maintained with the explosives safety site plan as part of the permanent record.

5. The POC is (Safety Specialist/Manager), telephone number, email address.

Signature
District/Installation/Garrison Commander
and/or Affected Mission Commander

APPENDIX T

EXPLOSIVES SAFETY SUBMISSION FOR CHEMICAL SAFETY SUBMISSIONS (CSS) CONTENT

T.01 GENERAL

T.01.01 A response in an area (e.g., a munitions response in an MRA or MRS) that is known or suspected to contain CA, regardless of configuration, must include a CWM site plan for an Interim Holding Facility (IHF) and, when the use of onsite destruction technology is planned, for the site at which those destruction activities will occur. Generally, the information required in a CSS parallels that for an ESS (see Appendix V); however, such information will be tailored to address CWM.

T.01.02 A CSS is not required for certain activities on a site with a history of CA-related activities when an installation or district commander, or a command-designated representative, has approved a probability assessment finding for such activities stating that the probability of discovering CA is expected to be “seldom” or “unlikely.” However, the site safety and health plan must include contingency plans providing for the safe and expeditious evacuation of the site in the event CA is discovered. Should CA, regardless of configuration, be discovered during these activities, all onsite activities shall be halted until the need for a CWM response is evaluated and a decision is approved by the Service-level explosives safety office. If it is decided that a CWM response is necessary, response actions that involve the intentional physical contact with CA, regardless of configuration, and/or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain CA shall not begin until the required CSS or CWM site plan is approved by the DDESB.

T.02 EXPLOSIVES HAZARDS. When explosives hazards are known or suspected to exist along with CA hazards within a response area (e.g., the MRA or MRS), a submission that

addresses both explosives safety (see Appendix V, V.01.) and CA safety (as outlined in this section) is required.

T.03 BACKGROUND ***> See Appendix V, V.01.01.***

T.04 MAPS. The maps provided with a CSS must meet the requirements of Appendix V, V.01.02. In addition, the One Percent Lethality Distance and the IBD shall be shown.

T.05 CHEMICAL AGENT HAZARDS. When CA hazards are known or suspected to exist within a response area (e.g., the MRA or MRS), the CA downwind hazard must be considered when determining the MSD. The CSS shall provide the following information:

T.05.01 A description of the CA MCE.

T.05.02 A description of how essential and nonessential personnel and the public will be protected should the CA MCE occur (see STD Chapter 11 for basic personnel protection requirements (e.g., hazard zones and protective equipment) for operations involving CWM). If an Engineering Control (EC), which has not been DDESB-approved, is to be used to provide such protection, the CSS must include the technical data substantiating the new engineering control's effectiveness. EC may be used for:

T.05.02.01 Protection from overpressure and fragments when explosively configured CWM are known or suspected.

T.05.02.02 Protection from CA effects (prevent vapor releases to the environment) during both response activities and when RCWM is stored in the IHF.

T.06 RCWM HAZARD CLASSIFICATION AND STORAGE

T.06.01 RCWM, suspected or confirmed, regardless of its configuration, must be stored separately from serviceable munitions and from other MEC. Additionally, suspect RCWM shall be stored separately from all other munitions and from RCWM.

T.06.02 Suspect and known RCWM shall be managed as HD 1.1 until stowed in an approved overpack container or until determined not to be RCWM (see Appendix V, V.01.03.03) or to be non-explosively configured RCWM (see subparagraph T.06.04, below). (NOTE: The CA downwind hazard must be considered, with the greater of the two distances used for siting purposes.)

T.06.03 Explosively-configured RCWM in an approved overpack container shall be managed as HD 1.2.1 with an explosive MCE of one round or HD 1.2.2, based on its NEWQD. Such storage may be considered HD 1.1 if advantageous for computing HFD using DDESB-approved procedures (see TP 16). (The CA downwind hazard must be considered, with the longer of the two distances used for siting purposes.)

T.06.04 Non-explosively configured RCWM shall be managed as HD 6.1. (The CA downwind hazard must be used for siting purposes.)

T.07 CWM SITE PLAN. A DDESB-approved CWM Site Plan for an IHF is required when CA, regardless of configuration, is known or suspected to exist on a response area. The IHF Site Plan, which is based on the worst-case CA configuration expected to be encountered, is included in the CSS. The IHF site plan shall:

T.07.01 Identify the public access exclusion distance (PAED).

T.07.02 Identify all associated ESQD arcs. >See Appendix V, V.01.03.

T.07.03 Address the evacuation procedures for personnel within the PAED.

T.07.04 Address any security measures and access controls for the IHF.

T.07.05 Address any EC that will be used to mitigate a CA release during IHF activities, such as:

T.07.05.01 Static storage within the IHF.

T.07.05.02 RCWM assessment activities [e.g., X-ray, portable isotopic neutron spectroscopy (PINS)].

T.07.05.03 Transportation preparation activities (e.g., transloading of multiple round containers (MRCs), MRC movement into or out of the IHF).

T.07.06 Address soil sampling maps. > See Appendix V, V.01.03.08.

T.07.07 Address types of CA. > See Appendix V, V.01.04.

T.07.08 Address start date. > See Appendix V, V.01.05.

T.08 DETECTION EQUIPMENT AND RESPONSE TECHNIQUES. ***> See Appendix V.01.07.***

T.09 DISPOSITION TECHNIQUES

T.09.01 CA, Regardless of Configuration

T.09.01.01 Briefly, describe the disposition techniques (e.g., onsite destruction) to be used.

T.09.01.02 When RCWM cannot be destroyed on site, address how CA safety and, if applicable, explosives safety requirements, will be met during transportation and during offsite storage, treatment or disposal. (Disposition actions should consider guidance applicable to waste military munitions.)

T.09.02 MPPEH. Describe the process to be used to manage MPPEH. > See STD Chapter 16.

T.10 ENVIRONMENTAL, ECOLOGICAL, CULTURAL, AND OTHER CONSIDERATIONS. ***> See Appendix V, V.01.09.***

T.11 TECHNICAL SUPPORT. ***> See Appendix V, V.01.10.***

T.12 RESIDUAL RISK MANAGEMENT. ***> See Appendix V, V.01.11.***

T.13 SAFETY EDUCATION PROGRAM. ***> See appendix V, V.01.12.***

T.14 CONTINGENCIES. ***> See Appendix V, V.01.14.***

T.15 UNEXPECTED MEC OR EXPLOSIVELY CONFIGURED CWM DISCOVERIES. Should unexpected MEC or explosively configured CWM be discovered during a CWM response, all onsite activities that involve intentional physical contact with such MEC or explosively configured CWM, or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain such MEC or explosively configured CWM, shall be halted until the newly identified explosive hazards are evaluated and the DDESB approves all required CSS amendments or explosives site plans.

BLANK

APPENDIX U

EXPLOSIVES SAFETY SUBMISSION FOR INSTITUTIONAL/ENGINEERING CONTROLS CONTENT

U.01 REASON FOR ORDNANCE AND EXPLOSIVES (OE)

U.01.01 Provide a brief description of why Ordnance and Explosives (OE) contamination exists in the specific area(s) of the site covered in the Explosives Safety Submission (ESS). This information may be derived from the following project documents: Inventory Project Report; Preliminary Assessment of Eligibility; Historical Records Searches; Archives Search Report; and/or Engineering Evaluation/Cost Analysis (EE/CA).

U.01.02 Provide a brief explanation that the site is under the Formerly Used Defense Site (FUDS) or Base Realignment and Closure (BRAC) program.

U.01.03 Provide a brief explanation that following an EE/CA or a risk assessment, the response action alternative of "Institutional/Engineering Controls" has been recommended. Include a description of the recommended institutional controls.

U.02 MAPS

U.02.01 Regional Map. Provide a map showing the regional location of the site. For example, provide a state map with the site identified on it.

U.02.02 Site Map.

U.02.02.01 Provide a site map, which illustrates the OE area(s) addressed in the ESS. Show the current use of each area (for FUDS) or the expected reuse of each area (for BRAC). The specific boundaries of the area(s) should be clearly noted. If other areas of the site are not covered by the ESS, the reasoning for their

exclusion should be explained. For example, these areas may be covered in a future ESS or were addressed by a previous ESS. If an area was covered in a previously approved ESS, then a copy of this ESS must be referenced in the new ESS and a copy of the approved ESS attached as an addendum to the new ESS.

U.02.02.02 Show the location of any areas which will be addressed by institutional or engineering controls. For example, if deed restrictions are to be imposed, show the area affected. As another example, if an area will be fenced off, show the fence line.

U.02.03 Soil Sampling Map. If sampling of soils or groundwater occurred during the site investigation, provide a map outlining the area(s) sampled and the location and depth of the sampling points. Identify the field screening methods used and the concentrations of munitions constituents for each sampling point. Identify any environmental or legal considerations that are important to the implementation of institutional/engineering controls.

U.03 JUSTIFICATION

U.03.01 Provide justification for institutional or engineering controls at the area(s) addressed in the ESS. This justification should include the following:

U.03.01.01 The amounts and types of OE found during the site investigation. Present a brief synopsis of the results of the surface and intrusive investigations. This discussion should be supported by a table showing: the amount of OE; type of OE; and the depths of OE found in each area investigated.

U.03.01.02 A summary of the risk analysis performed on the area(s) addressed in the ESS.

U.03.01.03 A summary of the cost- benefit analysis, if performed.

U.03.01.04 Provide a summary for the rationale for the selection of institutional or engineering controls as the most appropriate action,

based on the amount, type, and depth of OE found; the risk analysis; and (if available) the cost-benefit analysis.

U.03.01.05 If a Land Use Control Plan is available, provide it as an attachment to the ESS. If not available, describe each institutional or engineering control in detail. List the mechanism or agency where each control will reside (e.g., deed, local zoning board, building permit agency, local ordinance, etc). List who will monitor the effectiveness of the controls. List who will enforce the controls. List who will maintain any engineering controls (e.g., fences, signs). List any legal penalties, as applicable, for violation of any control. If public education is one of the selected controls, list who will be educated and how often and by what means. If fences and/or signs will be used, describe the type of fencing and the signage (content, spacing, size). If deed restrictions are used, include the restrictive language in substantially the same form, as it will appear in the deed, if possible.

U.04 START DATE. Not applicable.

U.05 MIGRATION OF OE

U.05.01 If the existing amounts, types, and depths of OE are expected to increase due to migration, describe what impact this will have on the level of risk at the site in the future. If the level of risk is expected to escalate back to an unacceptable level, describe what the plans are to address this escalation. Principle migration mechanisms are discussed below:

U.05.01.01 Frostline. State the depth of the frostline at the site. Where OE is above the frostline but is currently deep enough to be an acceptable risk with the chosen controls, but may migrate upward and cause trouble in the future, describe what provisions will be made for continued surveillance of the area.

U.05.01.02 If the area(s) encompass water bodies, then provide a discussion on the impact of wave action, tides, currents, storms, etc, on any potential OE migration.

U.05.01.03 If the area lies in a watershed such that runoff and erosion can carry OE from upstream into the area, address this concern.

U.06 CLEARANCE TECHNIQUES. Not applicable.

U.07 ALTERNATE TECHNIQUES. Not applicable.

U.08 QUANTITY DISTANCE. Not applicable.

U.09 OFF-SITE DISPOSAL. Not applicable.

U.10 TECHNICAL SUPPORT. Not applicable.

U.11 PUBLIC INVOLVEMENT

U.11.01 Discuss the public participation activities, which occurred as part of the EE/CA process, including:

U.11.01.01 Public meeting(s);

U.11.01.02 Restoration Advisory Board, if applicable;

U.11.01.03 30-day public comment period;

U.11.01.04 Press conference(s);

U.11.01.05 Media day(s); and

U.11.01.06 Location of the Administrative Record.

U.12 AFTER ACTION REPORT. An After Action Report will not be produced. A FUDS Completion Memorandum or Statement of Clearance will be executed to close out the project.

U.13 RECURRING REVIEW. Include a description of the Recurring Review Plan.

U.14 SUMMARY. Present a summation of the project, which mirrors the language in the conclusion of the EE/CA. It shall state that "A FUDS Completion Memorandum or Statement of Clearance will be placed in the Information Repository and may be placed in the Administrative Record."

BLANK

APPENDIX V

EXPLOSIVES SAFETY SUBMISSION FOR A NON-TIME-CRITICAL REMOVAL ACTION (NTCRA) CONTENT

V.01 REASON FOR ORDNANCE AND EXPLOSIVES. The below information is required in an ESS for the execution of the selected munitions response to address MEC. When CA, regardless of configuration, is known or suspected to be present along with explosive hazards, or when it is explosively configured, a submission that provides both explosives safety (as outlined in this section) and CA safety information (see Appendix T, T.01) is required.

V.01.01 Background. The ESS must provide, for informational purposes, a brief description of the reasons for the munitions response. The ESS must identify or provide:

V.01.01.01 The scope of munitions response activities.

V.01.01.02 Any significant differences in munitions response activities that will occur within the MRA or MRS. (NOTE: The ESS must identify significant differences in the current, determined, or reasonably anticipated future land use of different sections of the property, significant differences in the types or conditions of MEC expected to be encountered, and any sections of the MRA that will not require munitions response activities.)

V.01.02 Maps. The following maps and related information must be furnished:

V.01.02.01 Regional Map. A map depicting the regional location of the MRA or MRS (e.g., a state or boundary illustration map with the MRA indicated on it).

V.01.02.02 MRA or MRS Maps. Maps of the area or areas at which the munitions response is planned. These maps and related information shall indicate areas that:

V.01.02.02.01 Contain or are suspected of containing MEC that the ESS addresses.

V.01.02.02.02 Were suspected of containing MEC, but that research or site characterizations have subsequently shown do not contain such.

V.01.02.02.03 The ESS does not address, but that either a previous safety submission addressed or a future safety submission will address.

V.01.02.02.04 The current, determined, or reasonably anticipated future land use of property within the MRA or MRS that is known or suspected to contain MEC that the ESS addresses.

V.01.02.02.05 The ownership and land use of adjacent properties, as appropriate.

V.01.02.02.06 Any other situation that may influence or require consideration during the response (e.g., flight corridors, traffic routes).

V.01.03 ESQD

V.01.03.01 The planned locations for MEC response-related operations must be shown on ESQD maps. (NOTE: Preliminary site work, such as surveying, laying search lanes, and detecting anomalies does not require establishment of an ESQD arc.)

V.01.03.02 ESQD arcs for both intentional and unintentional detonations must be established and shown on ESQD maps for each MRS.

V.01.03.02.01 The Minimum Separation Distance (MSD) for unintentional detonations, which may be reduced by employing the engineering controls listed in TP 15 or other DDESB-approved engineering controls, for:

a. Nonessential personnel is the greatest distance of:

(1) Blast overpressure, as computed by using the formula: $D = 40W^{1/3}$ [$D=15.87Q^{1/3}$].

(2) The calculated HFD as provided in TP 16.

b. Team Separation Distance (TSD) is based on blast overpressure, as computed by the formula: $D = 40W^{1/3}$ [$D=15.87Q^{1/3}$].

V.01.03.02.02 The MSD for intentional detonations (see STD Chapter 9), which may be reduced by employing the engineering controls listed in TP15 or other DDESB-approved engineering controls, is the greatest distance of:

V.01.03.02.02.01 Blast overpressure, as computed by using the formula: $D = 328W^{1/3}$ [$D=130.16Q^{1/3}$].

V.01.03.02.02.02 The calculated MFD, as provided in TP16.

V.01.03.03 MEC, Excluding CA-filled Munitions, Hazard Classification, and Storage

V.01.03.03.01 Recovered MEC, other than Recovered CWM (RCWM), shall be managed as HD 1.1, unless assigned differently by an Interim Hazard Classification (IHC) authority, and assigned an appropriate CG. When storage at the MRA or MRS is necessary, recovered MEC must be stored separately from serviceable munitions and from any RCWM. NOTE: For RCWM, see Appendix T, T.06).

V.01.03.03.02 Nonessential personnel in structures shall be afforded protection equivalent to IBD from storage locations. Nonessential personnel in the open shall be afforded protection equivalent to PTRD from storage locations (See STD Chapter 9) There is no required ESQD protection for essential personnel from locations they are using for storage.

V.01.03.03.03 The IMD, based on the NEWQD of the munition with the greatest NEWQD that is reasonably expected to be encountered, applies from intrusive operations to storage sites to prevent propagation to a storage location in event of an accidental explosion during intrusive operations. For distances less than IMD, DDESB-approved engineering controls must be used during intrusive operations.

V.01.03.04 Planned or Established Demolition Areas. A planned or established demolition area is an area used repetitively to destroy munitions during a munitions response. (Such areas may be an existing OD area or a new area planned for intentional detonation.) An ESQD arc must be provided around demolition areas. The size of the ESQD arc will be based on requirements of STD Chapter 9.

V.01.03.05 Mechanized MEC, Excluding CA-filled Munitions, Processing Operations. Examples of such processing operations include, but are not limited to: power screening equipment, power rakes, and shredders.

V.01.03.05.01 Nonessential Personnel. Nonessential personnel shall be provided protection for intentional detonations (see subparagraph V.01.03.02.02, above) based on the MGFD.

V.01.03.05.02 Essential Personnel. Essential personnel shall, when appropriate:

V.01.03.05.02.01 Be protected by shields or barricades designed to defeat hazardous fragments from the MGFD.

V.01.03.05.02.02 Be separated from the operation by K24 based on the munition with the greatest NEWQD that is reasonably expected to be encountered. (NOTE: DDESB-approved overpressure-mitigating engineering controls may be used to provide an equivalent level of protection (2.3 psi) [15.9 kPa]).

V.01.03.06 Intentional Burning of Buildings Contaminated with Explosives Residues that Present an Explosive Hazard. All personnel shall be separated by K328 overpressure distance based on the MCE for the building, but not less than 1,250 feet.

V.01.03.07 ESQD Maps. (NOTE: The ESQD arcs and the MRA and MRS boundaries may be shown on the same map provided all PES and ES are shown in sufficient detail.)

V.01.03.07.01 ESQD-maps should be to scale and legible per STD subparagraph C5.4.4.3.2.

V.01.03.07.02 When a map does not contain a scale, all distances must be labeled.

V.01.03.07.03 The ESQD map shall show the following:

V.01.03.07.03.01 Each MRA or MRS.

V.01.03.07.03.02 The storage locations for demolition explosives and for recovered MEC.

V.01.03.07.03.03 Locations (planned or established) for the intentional detonations or burning of MEC, excluding CA-filled munitions. Such locations include areas where contained detonation technology will be used.

V.01.03.07.03.04 All ES and PES and their relationships. (NOTE: Describe any protective measures (e.g., evacuation of inhabited buildings, blocking off public highways) that will be used to

eliminate or minimize any exposures within the established exclusion zone.)

V.01.03.07.03.05 All controlling ESQD arcs.

V.01.03.07.04 ESQD Arcs. ESQD arcs must be shown for:

V.01.03.07.04.01 Munitions. The MGFD shall be used for ESQD purposes for any particular MRA or MRS. However, if a munition with a greater fragmentation distance is encountered during the conduct of a munitions response, the ESQD arcs must be adjusted and the ESS or explosives safety site plan must be amended.

V.01.03.07.04.02 Explosive Soil. To determine the ESQD arc for explosive soil, calculate the MCE by multiplying the weight of the mix by the concentration of explosives (e.g., 1,000 lb [453.60 kg] of soil containing 15 percent TNT has an MCE of 150 lb [68 kg]). When concentrations vary within the site, weighted averages or other valid mathematical technique can be used to determine the exclusion zone; however, the ESS must support their use. The MSD for nonessential personnel shall be the greater of IBD for overpressure or the soil ejecta radius per the Buried Explosion Module (BEM) contained in TP 16 or TP 15.

V.01.03.07.04.03 Real Property (Buildings and Installed Equipment). For real property that is known or suspected to be contaminated with explosives residues that present an explosive hazard, and that is slated for cleanup or dismantlement, the MCE will be estimated on a case-by-case basis. The ESS shall include the rationale used for the estimation.

V.01.03.08 Soil Sampling Maps. When the property involves concentrations of explosives in the soil that are high enough to present an explosive hazard (see STD subparagraph C12.4.1.):

V.01.03.08.01 Provide a map that indicates areas that were determined to contain explosive soil.

V.01.03.08.02 Address methods (e.g., blending, bio-remediation) to be used to reduce explosives concentrations to a non-reactive level.

V.01.03.08.03 Address methods (e.g., wetting the soil before blending) to be used to reduce any explosive hazards.

V.01.04 Types of MEC. Based on research or data generated from characterization of the MRA or MRS, provide the types of MEC expected to be encountered during munitions response activities.

V.01.05 Start Date. Provide the expected date that munitions response activities that involve the placement of explosives on a site, the intentional physical contact with MEC, or the conduct of ground-disturbing or intrusive activities in areas known or suspected to contain MEC are scheduled to start. Indicate the potential consequence, if any, if DDESB approval does not occur by the start date. (Site preparation activities (e.g., surveying, gridding, or locating anomalies) may be conducted while awaiting DDESB approval of an ESS.)

V.01.06 MEC Migration. Describe naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal changes) that could cause the migration or exposure of MEC, and procedures for monitoring and managing such.

V.01.07 Detection Equipment and Response Techniques. The intent of this section is to describe the capabilities of detection equipment relative to the degree of removal required to support the current, determined, or reasonably anticipated end use.

V.01.07.01 Describe the techniques to be used to detect and remove MEC.

V.01.07.02 Identify the types of detection equipment to be used and the areas in which they will be employed.

V.01.07.03 Summarize methods used (e.g., test plots) to establish the expected detection capabilities of the equipment used. If

anomaly discrimination will be used, explain what methods will be used to establish the expected accuracy of the discrimination.

V.01.07.04 When describing the detection methods:

V.01.07.04.01 Describe the rationale (e.g., best available technology based on geology, topography, munitions characteristics, resource requirements) used to select the detection methods and technologies to be used during the response.

V.01.07.04.02 Address any limitations (e.g., equipment, terrain, soil type) and mitigating actions, if any.

V.01.07.04.03 0Describe quality assurance and quality control (QA/QC) standards and pass or fail criteria for QA/QC control audits.

V.01.08 Disposition Techniques

V.01.08.01 MEC, Excluding CA-Filled Munitions.

V.01.08.01.01 Briefly, describe the MEC, excluding CA-filled munitions, disposition techniques (e.g., OB, OD, contained detonation, incineration) to be used.

V.01.08.01.02 When recovered MEC, excluding CA-filled munitions, cannot be destroyed within the MRA or MRS, address how explosives safety requirements will be met during transportation and during offsite storage, treatment, or disposal. (NOTE: Disposition actions should consider requirements applicable to waste military munitions.)

V.01.08.02 Material Potentially Presenting an Explosive Hazard (MPPEH). Describe the process to be used to manage MPPEH (see STD Chapter 16).

V.01.09 Environmental, Ecological, Cultural and Other Considerations. Address any environmental, ecological (e.g., endangered species), cultural (e.g., tribal spiritual or gathering

sites) and other factors that impacted, from an explosives safety perspective, the selection of the munitions response.

V.01.10 Technical Support. Summarize EOD, U.S. Army Forces Command/20th Support Command/22nd Chemical Battalion, or UXO-technician or UXO-qualified personnel support that may be required. (NOTE: U.S. Army Forces Command/20th Support Command/ 22nd Chemical Battalion is manned with specially trained personnel that provide verification, sampling, detection, mitigation, render safe, decontamination, packaging, escort, and remediation of chemical, biological and industrial devices or hazardous materials.)

V.01.11 Residual Risk Management. Address:

V.01.11.01 LUC. The ESS must summarize any LUC to be implemented and maintained on the property.

V.01.11.02 Long-Term Management. The ESS must address how any potential residual risks will be managed.

V.01.12 Safety Education Program. Address methods to be used to educate the public on the risks associated with MEC and CA, regardless of CA configuration.

V.01.13 Stakeholder Involvement. Briefly, summarize how stakeholder concerns affecting the explosives safety aspects of the selected munitions response were addressed.

V.01.14 Contingencies. To reduce the need to submit amendments (see STD subparagraph C12.6.1.), an ESS may describe alternative actions that could be used to address contingencies. As an example, an ESS may list alternative DDESB-approved engineering controls (TP 15) that may be used under specified conditions.

V.01.15 Unexpected CA Discoveries.0 Should CA, regardless of its configuration, be discovered during munitions responses to MEC, excluding CA-filled munitions, all onsite activities shall be halted

until the need for a CWM response is evaluated and a decision is approved by the Service-level explosives safety office. If it is decided that a CWM response is necessary, response actions that involve the intentional physical contact with CA, regardless of configuration, or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain CA shall not begin until the required CSS or CWM site plan is approved by the DDESB.

APPENDIX W

EXPLOSIVES SAFETY SUBMISSION FOR A TIME-CRITICAL REMOVAL ACTION (TCRA) CONTENT

W.01 SITE

W.01.01 Name/Project #

W.01.02 Location State County

W.02 ANTICIPATED DATES

W.02.01 Start

W.02.02 Complete

W.03 PURPOSE OF TCRA. *> For example, specific OE hazards to be controlled and populations to be protected.*

W.04 EXECUTING AGENCIES

W.04.01 Corps District POC Telephone

W.04.02 Huntsville POC Telephone

W.04.03 Contractor POC Telephone

W.05 SCOPE OF REMOVAL ACTION

W.05.01 Number of Areas

W.05.02 Total Acres

W.05.03 Removal Depths

W.05.04 Other response actions. If other actions are taken in addition to physical removal, list them (e.g., fences, signs, public education, closure, notification of local police, etc).

W.06 SAFETY CRITERIA

W.06.01 Munition item with greatest Fragmentation Distance Calculated Maximum Fragmentation Range (in feet)

W.06.02 Q-D OE Areas Minimum Separation Distance (in feet) Team Separation Distance (in feet)

W.06.03 Q-D Intentional Detonation Activities (in feet)

W.06.04 Q-D Explosives Storage Magazines (in feet)

W.06.05 DDESB Approved Engineering Controls in use

W.07 Q-D MAP. Provide Q-D map(s) showing the siting for the OE area(s), explosives storage magazines, and planned or established OB/OD areas.

W.08 FIELD OPERATIONAL SAFETY PRINCIPALS

W.08.01 Field operational safety principals are contained in Engineering Pamphlet 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations.

APPENDIX X

EXPLOSIVES SAFETY SUBMISSION FOR NO DOD ACTION INDICATED (NDAI/NOFA) CONTENT

X.01 REASON FOR ORDNANCE AND EXPLOSIVES (OE)

X.01.01 Provide a brief description of why Ordnance and Explosives (OE) contamination exists in the specific area(s) of the site covered in the Explosives Safety Submission (ESS). This information may be derived from the following project documents: Inventory Project Report; Preliminary Assessment of Eligibility; Historical Records Searches; Archives Search Report; and/or Engineering Evaluation/Cost Analysis (EE/CA).

X.01.02 Provide a brief explanation that the site is under the Formerly Used Defense Site (FUDS) or Base Realignment and Closure (BRAC) program.

X.01.03 Provide a brief explanation that following an EE/CA or a risk assessment, the response action alternative of “No DOD Action Indicated” has been recommended.

X.02 MAPS

X.02.01 Regional Map. Provide a map showing the regional location of the site. For example, provide a state map with the site identified on it.

X.02.02 Site Map. Provide a site map, which illustrates the OE area(s) addressed in the ESS. Show the current use of each area (for FUDS) or the expected reuse of each area (for BRAC). The specific boundaries of the area(s) should be clearly noted. If other areas of the site are not covered by the ESS, the reasoning for their exclusion should be explained. For example, these areas may be covered in a future ESS or were addressed by a previous ESS. If an area was covered in a previously approved ESS, then a copy of

this ESS must be referenced in the new ESS and a copy of the approved ESS attached as an addendum to the new ESS.

X.02.03 Soil Sampling Map. If sampling of soils or groundwater occurred during the site investigation, provide a map outlining the area(s) sampled and the location and depth of the sampling points. Identify the field screening methods used and the concentrations of munitions constituents for each sampling point.

X.03 JUSTIFICATION. Provide justification for No DOD Action Indicated at the area(s) addressed in the ESS. This justification should include the following:

X.03.01 The amounts and types of OE found during the site investigation. Present a brief synopsis of the results of the surface and intrusive investigations. This discussion should be supported by a table showing: the amount of OE, type of OE, and the depths of OE found in each area investigated.

X.03.02 A summary of the risk analysis performed on the area(s) addressed in the ESS.

X.03.03 A summary of the cost-benefit analysis, if performed.

X.04 START DATE. Not applicable.

X.05 MIGRATION OF OE

X.05.01 If the existing amounts, types, and depths of OE are expected to increase due to migration, describe what impact this will have on the level of risk at the site in the future. If the level of risk is expected to increase to an unacceptable level, describe what the plans are to address this escalation. Principal migration mechanisms are discussed below:

X.05.01.01 Frostline. State the depth of the frostline at the site. Where OE is above the frostline but is currently deep enough to be an acceptable risk, but may migrate upward and cause trouble in the future, describe what provisions will be made for continued surveillance of the area.

X.05.01.02 If the area(s) encompass water bodies, then provide a discussion on the impact of wave action, tides, currents, storms, etc, on any potential OE migration.

X.05.01.03 If the area lies in a watershed such that runoff and erosion can carry OE from upstream into the area, address this concern.

X.06 CLEARANCE TECHNIQUES. Not applicable.

X.07 ALTERNATE TECHNIQUES. Not applicable.

X.08 QUANTITY-DISTANCE. Not applicable.

X.09 OFF-SITE DISPOSAL. Not applicable.

X.10 TECHNICAL SUPPORT. Not applicable.

X.11 PUBLIC INVOLVEMENT

X.11.01 Discuss the public participation activities which occurred as part of the EE/CA process, including:

X.11.01.01 Public meeting(s);

X.11.01.02 Restoration Advisory Board, if applicable;

X.11.01.03 30-day public comment period;

X.11.01.04 Press conference(s);

X.11.01.05 Media day(s); and

X.11.01.06 Location of the Administrative Record.

X.12 AFTER ACTION REPORT. An After Action Report will not be produced. A FUDS Completion Memorandum or Statement of Clearance will be executed to close out the project.

X.13 RECURRING REVIEWS. Include a description of the Recurring Review Plan.

X.14 SUMMARY. Present a summation of the project that mirrors the language in the conclusion of the EE/CA. State that “A FUDS Completion Memorandum or Statement of Clearance will be placed in the Information Repository and may be placed in the Administrative Record.”

APPENDIX Y

EXPLOSIVES SAFETY SUBMISSION FOR CONSTRUCTION SUPPORT CONTENT

A safety submission is required for construction support where the probability of encountering MEC or CA, regardless of CA configuration, is considered moderately or highly probable. This submission must provide the information outlined in Appendices V and T, as appropriate. The information may be tailored based on site-specific conditions.

BLANK

APPENDIX Z

BLANK

BLANK

GLOSSARY

SECTION I
ACRONYMS

3 Rs.....Recognize, Retreat, Report
AAR.....After-Action Reports
AC .....Hydrogen Cyanide
ACOM .....Army Command
AE .....Ammunition and Explosives
AFM .....Air Force Manual
AFSC .....Air Force Safety Center
AGM.....Above-Ground Magazine
AHA.....Activity Hazard Analysis
AKO .....Army Knowledge On-line
AM.....Action Memorandum
AMRDEC.....Aviation and Missile Research Development Engineering Center
ANSI.....American National Standards Institute
APP.....Accident Prevention Plan
AR .....Army Regulation
ASCC .....Army Service Component Command
ASP.....Ammunition Supply Point
ASSE .....American Society of Safety Engineers
ASSHP.....Abbreviated Site Safety and Health Plan
ASTM .....American Society for Testing and Materials
ATF .....Bureau of Alcohol, Tobacco, and Firearms
BATF.....Bureau of Alcohol, Tobacco, and Firearms
BEM .....Buried Explosion Module
BIP .....Blown-In-Place
BRAC .....Base Realignment and Closure
BWM .....Biological Warfare Materiel
CA .....Chemical Agent
CACM .....Chemical Agent Contaminated Media
CAFS .....Chemical Agent Filtration System
CAIS.....Chemical Agent Identification Set
CAR .....Corrective Action Request
CD.....Compact Disc

CDC ..... Contained Detonation Chamber
CERCLA..... Comprehensive Environmental Response, Compensation, and Liability Act
CESO ..... U.S. Army Corps of Engineers Safety Office
CFR..... Code of Federal Regulations
CG..... Phosgene (CA); also Carbonyl Dichloride
CHP ..... Certified Health Professional
CIH..... Certified Industrial Hygienist
CK ..... Ryanogen Chloride
CO..... Contracting Officer
COR ..... Contracting Officer's Representative
CP ..... Career Program
CPR ..... Cardiopulmonary Resuscitation
CRA ..... Certificate of Risk Acceptance
CRM..... Composite Risk Management
CRZ..... Contamination Reduction Zone
CS ..... 2-chlorobenzalmalononitrile **(**Riot Control Agent)
CSP..... Certified Safety Professional
CSP..... Chemical Site Plan
CSS..... Chemical Safety Submission
CWA..... Chemical Warfare Agent
CWM ..... Chemical Warfare Materiel
DA ..... Department of the Army
DA Pam..... Department of the Army Pamphlet
db(A) ..... decibels A-weighed
DD..... Decision Document
DDESB..... Department of Defense Explosives Safety Board
Demil..... Demilitarization
DERP ..... Defense Environmental Remediation Program
DF ..... Methylphosphonic Difluoride
DID..... Data Item Description
DM ..... Decision Memorandum
DMM ..... Discarded Military Munition
DoD..... Department of Defense
DoDI..... Department of Defense Instruction
DRU ..... Direct Reporting Unit
ECBC ..... Edgewood Chemical and Biological Command
ECM ..... Earth-Covered Magazine
EE/CA ..... Engineering Evaluation/Cost Analysis

EM.....Engineer Manual
EM CX.....Environmental and Munitions Center of Expertise, Military Munitions Division
EMM.....Earth-Moving Machinery
EMR.....Electromagnetic Radiation
EOD.....Explosive Ordnance Disposal
EP.....Engineer Pamphlet
ER.....Engineer Regulation
ERDC.....USACE Engineer Research and Development Center
ES.....Exposed Site
ESAV.....Explosives Safety Assistance Visit
ESP.....Explosives Site Plan
ES-QD.....Explosive Safety Quantity Distance
ESS.....Explosive Safety Submission
ESSP.....Explosives Safety Site Plan
ESSS.....Explosives Safety Siting Software Program
EZ.....Exclusion Zone
FHA.....Facility Hazard Assessment
FRAG.....Fragmentation
FS.....Feasibility Study
ftp.....file transfer point
FUDS.....Formerly Used Defense Sites
GDA.....Government Designated Authority
GIS.....Geospatial Information System
GS.....General Schedule
H & HD & HS.....Mustard (CWA)
HAZWOPER.....Hazardous Waste Operations and Emergency Response
HD.....Hazard Distance/Classification
HE.....High Explosives
HEAT.....High Explosives Anti-Tank
HFD.....Hazardous Fragment Distance
HMX.....High-Molecular-Weight-RDX
HTRW.....Hazardous, Toxic, and Radioactive Waste
IAW.....In Accordance With
IBD.....Inhabited Building Distance
ICM.....Improved Conventional Munition
IDS.....Intrusion Detection System

IED ..... Improvised Explosive Device
IGD..... Interim Guidance Document
IHF ..... Interim Holding Facility
ILD ..... Intra-Line Distance
IMCOM..... Installation Management Command
IMD ..... Intra-Magazine Distance
IMP..... Installation Master Plan
in ..... Inch
ISEA..... International Safety Equipment Association
K-11 ..... Unbarricaded Above-Ground Intra-Magazine Distance (IMD)
K-18 ..... Unbarricaded Intra-Line Distance (ILD)
K-24 ..... Public Traffic Route (PTR) Distance < 100,000 lbs
K-40 ..... IBD<100,000 lbs, also TSD during MEC activities for essential personnel
K-328 ..... Distance non-essential personnel must be for intentional detonations for protection from blast only
L ..... Lewisite
lbs ..... Pounds
LPS ..... Lightning Protection System
MACOM ..... Major Army Command
MC ..... Munitions Constituents
MCA ..... Major Construction Army
MCE ..... Maximum Credible Event
MD ..... Munitions Debris
MEC ..... Munitions and Explosives of Concern
MFD…… Maximum Fragment Distance
MFR-H..... Maximum Fragment Range – Horizontal
MFR-V..... Maximum Fragment Range – Vertical
MGFD ..... Munition with the Greatest Fragmentation Distance
MM ..... Military Munitions
mm ..... millimeters
MMRP ..... Military Munitions Response Project(s)
MOOTW..... Military Operations Other Than War
MPPEH ..... Material Potentially Possessing an Explosive Hazard
MRA ..... Munitions Response Area

MRS ..... Munitions Response Site
MSC ..... Major Subordinate Command
MSD ..... Minimum Separation Distance
MSDS..... Material Safety Data Sheets
M^2S^2 ..... Military Munitions Support Services
NAVSEA OP ..... Naval Sea Systems Command Ordnance Pamphlet
NDAI ..... No Department of Defense Action Indicated
NEQ ..... Net Explosive Quantity
NEW..... Net Explosive Weight
NEWQD ..... Net Explosive Weight Quantity Distance
NFPA ..... National Fire Protection Association
NOFA ..... No Further Action
NOSSA..... Naval Ordnance Safety and Security Activity
NTCRA..... Non-Time Critical Removal Action
NTP ..... Notice to Proceed
OB/OD ..... Open Burning/Open Detonation
OCONUS ..... Outside the Continental United States
OE..... Ordnance and Explosives
OESS ..... OE Safety Specialist
OSHA..... Occupational Safety and Health Administration
OTM ..... Other than Munitions
PA ..... Preliminary Assessments
PAED ..... Public Access Exclusion Distances
PAM ..... Pamphlet
PAO ..... Public Affairs Officer
Pdf..... Portable document format
PDT ..... Project Delivery Team
PES..... Potential Explosion Site
PHA..... Position Hazard Analysis
PM..... Project Manager
PMECW ..... Program Manager for the Elimination of Chemical Weapons
POC ..... Point of Contact
PPE..... Personal Protective Equipment
PS ..... Chloropicrin
PTR..... Public Traffic Route
PTRD ..... Public Traffic Route Distance
PWS..... Performance Work Statement

PZ ..... Piezoelectric
QAI ..... Quality Assurance Inspections
QAR ..... Quality Assurance Representative
QASAS ..... Quality Assurance Specialist, Ammunition Surveillance
QASP ..... Quality Assurance Surveillance Plan
QC ..... Quality Control
QCI ..... Quality Control Inspection
QCP ..... Quality Control Plan
QCS ..... Quality Control Supervisor
QD ..... Quantity-Distance
QL ..... Methylphosphonite
RA ..... Remedial Action
RBC ..... Regional Business Centers
RCWM ..... Recovered Chemical Warfare Materiel
R&D ..... Research and Development
RDTE ..... Research, Development, Test, and Evaluation
RDX ..... Cyclotrimethylenetrinitramine
RI ..... Remedial Investigation
RI/FS ..... Remedial Investigation/Feasibility Study
RPMP ..... Real Property Master Plan
RSP ..... Render Safe Procedures
SAA ..... Small Arms Ammunition
SAFER ..... Safety Assessment for Explosives Siting Program
SDD ..... Sustainable Design and Development
SDW ..... Substantial Dividing Wall
SHM ..... Safety and Health Manager
SOFA ..... Status of Forces Agreements
SOHO ..... Safety and Occupational Health Office
SSHP ..... Site Safety and Health Plan
STD ..... Standard
SUXOS ..... Senior UXO Supervisor
TB ..... Technical Bulletin
TCRA ..... Time Critical Removal Action
TE/TEU ..... U.S. Army Technical Escort Unit
TM ..... Technical Manual
TNT ..... Trinitrotoluene
TP ..... Technical Paper
TSD ..... Team Separation Distance

TWA ..... Time Weighted Average
US ..... United States
USACE ..... U.S. Army Corps of Engineers
USACHPPM ..... U.S. Army Center for Health Promotion and Preventive Medicine
USAESCH ..... U.S. Army Engineering and Support Center, Huntsville, Alabama
USATCES ..... United States Army Technical Center for Explosives Safety
USC ..... United States Code
UXO ..... Unexploded Ordnance
UXOQCS ..... UXO Quality Control Specialist
UXOSO ..... UXO Safety Officer
UXOSP ..... UXO Sweep Personnel
UXOTI ..... UXO Technician I
UXOTII ..... UXO Technician II
UXOTIII ..... UXO Technician III
V & G ..... Series of Chemical Nerve Agents
WFO ..... Work for Others
WP ..... White Phosphorous
WP ..... Work Plan
WZ ..... Work Zone

SECTION II
TERMS

3 Rs
Refer to encountering or suspecting to have encountered MEC or MPPEH**, DON'T TOUCH IT,** leave it in place and keep people away - Remember the 3Rs: **RECOGNIZE, RETREAT, REPORT.**

Aboveground Magazine (AGM)
Any open area or any structure used for explosives storage that does not meet the requirements of an ECM.

Accident Prevention Plan (APP)
A document that outlines occupational safety and health policy, responsibilities, and program requirements.

Active Installations
Installations under the custody and control of the Army; includes operating installations, installations in a standby or layaway status, and installations awaiting realignment or closure under BRAC.

Administration Area
The area in which administrative buildings that function for the garrison or installation as a whole, excluding those offices located near and directly serving components of explosives storage and operating areas, are located.

Administrative Record
The body of documents that “forms the basis” for the selection of a particular response at the project. These are relevant documents that were relied upon in selecting the response action as well as relevant documents that were considered but ultimately rejected.

Ammunition
Generic term related mainly to articles of military application consisting of all kinds of bombs, grenades, rockets, mines, projectiles and other similar devices or contrivances.

Anomaly Avoidance
Techniques employed on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., Discarded Military Munitions (DMM)), Munitions Constituents (MC) in high enough concentrations to pose an explosive hazard, or chemical agent (CA), regardless of configuration, to avoid contact with potential surface or subsurface explosives or CA hazards, to allow entry into the area for the performance of the required operations.

Archives Search Report (ASR)
A detailed investigation to report on past MEC activities conducted on an installation; includes an MEC-specific project inspection and historical records searches.

Army Commands (ACOMs)
U.S. Army Forces Command (FORSCOM), U.S. Army Training and Doctrine Command (TRADOC), and U.S. Army Materiel Command (AMC).

Army Service Component Commands (ASCC)
Army Europe, Army Central, Army North, Army South, Army Pacific, United States Army Special Operations Command (USASOC), Surface Deployment and Distribution Command (SDDC), Space and Missile Defense command (SMDC) and Eighth United States Army (EUSA).

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

Barricade
An intervening barrier, natural or artificial, of such type, size, and construction as to limit in a prescribed manner the effect of an explosion on nearby buildings or exposures.

Biological Warfare Materiel (BWM)
An item configured as a munition containing an etiologic agent that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. BWM can also include etiologic agents that are designed to damage or destroy crops that are intended for human consumption.

Certificate of Risk Acceptance (CRA)
Permanent written documentation of command's acceptance of the risk associated with an event that those not meet regulatory requirements and/or exposes soldiers, civilian, and contractor personnel, the public, or real property to a risk at greater than a de-minims threshold. An informal risk acceptance process may be substituted for a CRA for one-time event of one week or less duration. CRA is highly recommended since it will replace all waivers and exemptions by 1 October 2011.

Chemical Agent (CA)
A chemical compound (to include experimental compounds) that, through its chemical properties, produces lethal or other damaging effects on human beings, is intended for use in military operations to kill, seriously injure, or incapacitate persons through its physiological effects. Excluded are research, development, testing, and evaluation (RDTE) solutions; riot control agents; chemical defoliants and herbicides; smoke and other obscuration materials; flame and incendiary materials; and industrial chemicals.

Chemical Agent Contaminated Media (CACM)
Any mixture of detectable concentrations of chemical agents with soil, water, debris, or other solid or liquid media.

Chemical Agent (CA) Hazard
A condition where danger exists because CA is present in a concentration high enough to present potential unacceptable effects (such as death, injury, or damage) to people, operational capability, or the environment.

Chemical Agent (CA) Safety
A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of a mishap involving chemical warfare material (CWM) and CA in other than munitions configurations.

Chemical Event Report
A report that documents chemical accidents, incidents, and other circumstances where there is a confirmed or likely release to the environment, exposure of personnel, threat to the security of chemical agent materiel, or any incident of concern to the local commander (AR 50-6). Additional notification procedures for USACE RCWM projects are identified in CEMP-CE Memorandum Interim Guidance – Notification Procedures for Discovery of Recovered Chemical Warfare Materiel (RCWM) During USACE Projects.

Chemical Safety Submission (CSS)
A document that serves as the instrument to describe planned chemical and explosives safety actions to the appropriate approval authority.

Chemical Warfare Materiel (CWM)
Items generally configured as a munition containing a chemical compound that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. CWM includes V- and G-series nerve agents or H-series (mustard) and L-series (lewisite) blister agents in other-than-munition configurations; and certain industrial chemicals (e.g., hydrogen cyanide (AC), cyanogen chloride (CK), or carbonyl dichloride (called phosgene or CG)) configured as a military munition. Due to their hazards, prevalence, and military-unique application, non-dilute chemical agent identification sets (CAIS) are also considered CWM. CWM

does not include: riot control devices; chemical herbicides; industrial chemicals (e.g., AC, CK, or CG) not configured as a munition; smoke and flame producing items; or soil, water, debris or other media contaminated with low concentrations of chemical warfare agents where no CA hazards exist.

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

Demilitarization
Destruction of MM, or having key components removed or destroyed. To mutilate, disarm, neutralize, and accomplish any other action required to render ammunition, explosives, and chemical agents innocuous or ineffectual for military use.

Demolition
Refers to activities requiring the use of explosives to demolish a structure (e.g., infrastructure, embankment) or perform excavation (e.g., soil, quarry). Other terms used to describe this operation include: blasting, implosion, or detonation.

Detonation
A violent chemical reaction within a chemical compound or mechanical mixture involving heat and pressure. A detonation is a reaction which proceeds through the reacted material toward the non-reacted material at a supersonic velocity. A detonation, when the material is located on or near the surface of the ground, is normally characterized by a crater.

Direct Reporting Units (DRU)
Network Enterprise Technology Command (NETCOM), Medical Command (MEDCOM), Intelligence and Security Command (INSCOM), Criminal Investigation Division Command (CIDC), United States Army Corps of Engineers (USACE), Military District of Washington (MDW), Army Test and Evaluation Command (ATEC), United States Military Academy (USMA), United States Army Reserve Command (USARC), Acquisition Support Command (ASC), and Installation Management Agency (IMA).

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

Disposal
End of life tasks or actions for residual materials resulting from demilitarization or disposition operations.

Disposition
Reusing, recycling, converting, redistributing, transferring, donating, selling, demilitarizing, treating, destroying, or fulfilling other life-cycle guidance, for DoD property subject to these standards.

Electrical lines
See transmission lines, distribution lines, or service lines.

Energetic Liquid
A liquid, slurry, or gel consisting of or containing an explosive, oxidizer, fuel, or their combination that may undergo, contribute to, or cause rapid exothermic decomposition, deflagration, or detonation.

Engineering Controls
Any process or device designed to mitigate explosion effects (such as, blast overpressure, fragmentation, fire) or to contain vapor releases from RCWM; regulation of facility operations through the use of prudent engineering principles, such as facility design, operation sequencing, equipment selection, and process limitations.

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

Exclusion Zone (EZ)
A safety zone established around a MEC-related operation work area. Only essential project personnel and authorized, escorted visitors are allowed within the exclusion zone. Examples of EZs are safety zones around MEC intrusive activities and safety zones where MEC is intentionally contacted or detonated. For RCWM project sites, it is the area within the No Significant Effects (NOSE) zone.

Exemption
A written authority that permits long-term noncompliance with mandatory requirement of U.S. Army AE safety standards. Existing exemptions will be replaced at their next scheduled review date and all exemptions will be replaced not later than 1 October 2011.

Explosion
A chemical reaction of any chemical compound or mechanical mixture that, when initiated, undergoes a very rapid combustion or decomposition, releasing large volumes of highly heated gases that exert pressure on the surrounding medium. Depending on the rate of energy release, an explosion can be categorized as a deflagration or a detonation.

Explosive
A substance or a mixture of substances that is capable by chemical reaction of producing gas at such temperature, pressure, and speed as to cause damage to the surroundings. The term "explosive" includes all substances variously known as high explosives and propellants, together with igniters, primers, initiators, and pyrotechnics (e.g., illuminant, smoke, delay, decoy, flare, and incendiary compositions).

Explosive Media
Mixtures of explosives in soil, sand, clay, or other solid media at concentrations such that the mixture itself is explosive.

Explosive Ordnance Disposal (EOD)
Military personnel who have graduated from the Naval School, Explosive Ordnance Disposal; are assigned to a military unit with a Service-defined EOD mission; and meet Service and assigned unit requirements to perform EOD duties. EOD personnel have received specialized training to address explosive and certain CA hazards during both peacetime and wartime. EOD personnel are trained and equipped to perform render safe procedures (RSP) on nuclear, biological, chemical, and conventional munitions, and on improvised explosive devices (IED).

Explosives Hazards
A condition where danger exists because explosives are present that may react (e.g., detonate, deflagrate) in a mishap with potential unacceptable effects (e.g., death, injury, damage) to people, property, operational capability, or the environment.

Explosives Safety
A condition where operational capability and readiness, people, property, or the environment is protected from the unacceptable effects or risks of potential mishaps involving DoD military munitions or other encumbering explosives or munitions.

Explosives Site Plan (ESP)
An explosives site plan is required for munitions response site (MRS) investigations or characterizations of an MRS that involve intentional physical contact with MEC (for example, surface and intrusive sampling during an EE/CA or RI/FS). The explosives site plan will be used to provide explosives safety criteria for planning the siting of explosives operations for Munitions Response or other MEC-related projects (such as on-site construction support involving a MEC removal). Such site plans will address areas (magazines, for example) used for the storage of commercial and/or military demolition explosives or MEC, planned or established demolition or disposal areas for MEC found during the investigation; and the boundary of the munitions response area to be investigated. The explosives site plan will address the explosives safety quantity-distances for each of the potential explosion sites (including magazines, demolition areas, munitions response areas, collection points), the location of exposed sites (such as inhabited buildings, public traffic routes), and engineering controls to be used.

Explosives Safety Submission (ESS)
The Explosives Safety Submission (ESS) will be used to provide munitions response action explosives safety criteria for approval by DDESB. The ESS for TCRA will provide the information required in the explosives site plan plus a short introduction concerning site history and any other pertinent details, the reason why MEC exists on the MRS, the amount and type of MEC expected, the selected munitions response action (for example, surface removal, removal to depth of detection), the start date for the munitions response action. The ESS for NTCRA will include all of the above plus the following: possible MEC migration mechanisms, the techniques to be used to detect, recover, and destroy MEC, alternate MEC disposal techniques (if any) to be used either on-site or off-site, technical support (such as, contractor, USACE, EOD, TEU), land use restrictions, public involvement, recurring reviews, MEC education, and any contingencies.

Field Office
An office required by operational supervision; for example, foremen and line supervisors, in direct support of AE operations.

Fire Hazard Area
A location in which the primary, but not necessarily the only, hazard is that of fire, including explosions of gas or vapor and air mixtures.

Firewall
A wall of fire-resistive construction designed to prevent the spread of fire from one side to the other. A firewall may also be termed a "fire division wall."

Formerly Used Defense Sites (FUDS)
A facility or project (property) that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination by hazardous substances. By the Defense Environmental Restoration Program (DERP) policy, the FUDS program is limited to those properties that were transferred from DoD control prior to 17 Oct 1986. FUDS properties can be located within the 50 States, District of Columbia, Territories, Commonwealths and possessions of the US.

Fragment
A piece of an exploding or exploded munition. Primary fragments may be complete items, subassemblies, pieces thereof, or pieces of equipment that are in immediate contact with explosives. Secondary fragments are from pieces of equipment or buildings containing the items.

Fragment Distance
The limiting range, based on a specific density of hazardous fragments, expected from the type and quantity of explosives involved. Used in establishing certain Q–D criteria. A hazardous fragment is a fragment having an impact energy of 58 foot-pound or greater. Hazardous fragment density is a density of hazardous fragments exceeding one per 600 square feet.

Garrison
A permanent military post for stationing of Soldiers.

Geophysical Techniques
Techniques for the detection and measurement of buried anomalies (e.g., ferromagnetic indicators and ground penetrating radar) to investigate the presence of munitions.

Hazard
Any existing or potential condition that can cause injury, illness, or death of personnel, or damage to or loss of equipment or property.

Hazard Analysis
The logical, systematic examination of an item, process, condition, facility, or system to identify and analyze the probability, causes, and consequences of potential or real hazards.

Hazard Class
The United Nations Organization hazardous classification system, which contains 9 hazard classes, is used by the DOD for dangerous materials to identify the hazardous characteristics of A&E. Hazard class 1 (A&E) is further divided into 7 division designators that indicate the primary characteristics and associated hazards.

Hazardous Fragment
A fragment having an impact energy of 58 foot-pound or greater and/or a weight greater than 2,700 grains (6.17 ounces or 175.5 grams).

Hazardous Fragment Density
A density of hazardous fragments exceeding one hazardous fragment per 600 square feet.

Hazardous Fragment Distance (HFD)
Also known as the 1-in-600 distance. This is the calculated distance at which a fragment impacts at 58 foot pounds, or more, of energy. This is also the distance at which non-essential personnel must be kept from MEC activities for unintentional detonations for fragmenting munitions.

Hazardous, Toxic, and Radioactive Waste (HTRW) Activities
HTRW activities include those activities undertaken for the Environmental Protection Agency's Superfund program, the Defense Environmental Restoration Program (DERP), including Formerly Used Defense Sites (FUDSs), and Installation Restoration Program (IRP) sites at active DoD facilities, HTRW actions associated with Civil Works projects, and any other mission or non-mission work performed for others at HTRW sites.

Holding Yard
A location for groups of railcars, trucks, or trailers used to hold ammunition, explosives, and dangerous materials for interim periods before storage or shipment.

Improved Conventional Munitions (ICM)
Munitions characterized by the delivery of two or more anti-personnel, anti-material, or anti-armor submunitions by a parent munition.

Industrial Chemical
A chemical developed or manufactured for use in industrial operations or research, by industry, government, or academia. Previously identified as chemical warfare agents: hydrogen cyanide (AC), cyanogen chloride (CK), phosgene (CG), methylphosphonic difluoride (DF), O-ethyl (2-isopropyl aminoethyl) methylphosphonite (QL), and chloropicrin (PS) are now considered industrial chemicals. If these chemicals are weaponized, consider them to be RCWM. Weaponized means these chemicals were placed into ammunition containers; e.g., projectiles, mines, bombs, etc.

Inhabited Buildings
Buildings or structures, other than operating buildings occupied in whole or in part by human beings, both within and outside DOD installations. They include but are not limited to schools, churches, residences (quarters), Service clubs, aircraft passenger terminals, stores, shops, factories, hospitals, theaters, mess halls, post offices, and post exchanges.

Inhabited Building Distance (IBD)
The minimum distance permitted between an inhabited building and an ammunition or explosives location for the protection of administration, quarters, industrial and other similar areas within a garrison or installation; the distance required to be maintained between a potential explosion site (PES) and an inhabited building.

Installation
Services installations are defined as establishments used for military purposes but not primarily for the stationing of Soldiers. They include such locations as depots, activities, ports, ASPs, basic load ammunition storage areas, and ammunition plants. Installations also refer to DOD establishments in an inactive, standby, or layaway status; facilities awaiting closure under BRAC, other legislation, or under normal procedures for excess property; and other closed facilities not yet transferred from a Service control. Examples of inactive, standby, or layaway installations include but are not limited to posts, camps (including National Guard camps), forts, depots, activities, ports, ASPs, basic load ammunition storage areas, and ammunition plants.

Intermagazine Distance (IMD)
The minimum distance permitted between any 2 magazines depending on the type of magazine and the class/division quantity of explosives and ammunition involved; the type and quantity of explosives requiring the greater distance will govern the magazine separation. Also called “intermagazine separation.”

Intraline Distance (ILD)
The distance to be maintained between any 2 operating buildings and sites within an operating line, of which at least 1 contains or is designed to contain explosives, except that the distance from a service magazine for the line to the nearest operating building may be not less than the ILD required for the quantity of explosives contained in the service magazine.

Intrusive Activity
An activity, which involves, or results in, the penetration of the ground surface at an area known or suspected to contain MEC or RCWM in other than munitions (OTM) configurations. Intrusive activities can be of an investigative or removal action nature.

K–factor
The factor in the formula D = KW1/3 used in QD determinations where “D” represents distance in feet and “W” is the NEW in pounds. The K–factor is a constant and represents the degree of damage that is acceptable. Typical constants range from 1.25 to 50; the lower the factor, the greater the acceptance of damage. The K–factors also correspond with specific overpressure levels.

Laboratory
An individual room or rooms within a facility that provides space in which work with etiologic energetics or chemical agents may be performed. It contains appropriate engineering features and equipment required for either a given biosafety level or chemical agent to protect personnel working in the laboratory and the environment and personnel outside of the laboratory.

Loading Docks
Facilities, structures, or paved areas, designed and installed for transferring AE between any 2 modes of transportation.

Lunchroom
Facilities where food is prepared or brought for distribution by food service personnel. It may serve more than one PES. Personnel may use a breakroom in an operating building PES to eat meals. Lunchrooms generally require application of QD, breakrooms do not.

Magazine
Any building or structure, except an operating building, used for the storage of AE.

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

Maximum Credible Event (MCE)
In hazards evaluations, the MCE, from a hypothesized accidental explosion, fire, or toxic chemical agent release (with explosives contribution) is the worst single event that is likely to occur from a given quantity and disposition of ammunition and explosives (AE). The event must be realistic with a reasonable probability of occurrence considering the explosion propagation, burning rate characteristics, and physical protection given to the items involved. The MCE evaluated on this basis may then be used as a basis for effects calculations and casualty predictions.

Maximum Fragment Range (MFR)
This is the distance at which most fragments from a MEC item will travel. This is the prescribed minimum separation distance (MSD) for all personnel on an MMRP site from intentional detonations, unless DDESB-approved engineering controls are used. There is a MFR-H and an MFR-V. This stands for maximum fragment range on a horizontal basis and a maximum fragment range on a vertical basis.

Military Munitions (MM)
Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. [10 U.S.C. 101(e)(4)(A) through (C)].

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

Munitions Constituents (MC)
Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. [10 U.S.C. 2710(e)(3)].

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

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

Munitions and Explosives of Concern (MEC) Related Operations
Any operations conducted by UXO Technicians/Qualified personnel with the purpose of intentional physical contact with MEC.

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

Munitions Response
Response actions, including investigation, removal actions, and remedial actions to address the explosives safety, human health, property or environmental risks presented by UXO, DMM, or MC, or to support a determination that no removal or remedial action is required.

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

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

Net Explosive Quantity (NEQ)
Net explosive quantity (expressed in kilograms)

Net Explosive Weight (NEW)
Net explosive weight (expressed in pounds)

Non-DOD Component
Any entity (Government, private, or corporate) that is not a part of DOD.

No Significant Effects (NOSE) Distance
The distance at which the general population (to include more susceptible subpopulations) would not experience any significant effects from exposure of chemical agents.

On-site Construction Support
Dedicated UXO construction support, where the probability of encountering MEC, or RCWM, has been determined to be moderate to high.

On-The-Surface
A situation in which MEC, or RCWM, are: (a) entirely or partially exposed above the ground surface (i.e., the top of the soil layer); or (b) entirely or partially exposed above the surface of a water body (e.g., because of tidal activity)

Operating Building
Any structure, except a magazine, in which operations pertaining to manufacturing, processing, handling, loading, or assembling of AE are performed.

Ordnance and Explosives (OE) Safety Specialist
A USACE employee who is qualified through experience and completion of the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, Maryland, or U.S. Naval EOD School, Indian Head, Maryland ,or Eglin AFB, Florida, and is classified in the GS-0018 job series (CP-12 career series). Performs safety and occupational health support and oversight of projects involving MEC/RCWM.

Parametric Design - (Code 3, 5 - 15 Percent Design)
One of two “first stages” of design used in the MILCON programming and execution process, the other being the concept design level. A Code 3 design directive authorizes the design contracting officer to proceed through the 5 - 15 percent design stage. (See AR 420-1, Chapter 4.)

Potential Explosion Site (PES)
The location of a quantity of Ammunition and Explosives (AE) that will crate a blast, fragment, thermal, or debris hazard in the event of an accidental explosion of its contents.

Primary Explosives
Primary explosives are highly sensitive compounds that are typically used in detonators and primers. A reaction is easily triggered by heat, spark, impact or friction. Examples of primary explosives are lead azide and mercury fulminate.

Public Traffic Route (PTR)
Any public street, road, highway, navigable stream, or passenger railroad (includes roads on a military reservation that are used routinely by the general public for through traffic).

Pyrotechnic Material
The explosive or chemical ingredients, including powdered metals, used in the manufacture of military pyrotechnics.

Quality
The totality of features and characteristics of a product or service that bear on its ability to meet the stated or implied needs and expectations of the project. Quality expectations need to be negotiated among the PDT members (which includes the customer) and are set in the Project Management Plan. (ER 5-1-11). More specifically, the quality of a response action is measured by how closely that response action meets the standards and expectations of the customer.

Quality Assurance (QA)
An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed to meet project requirements defined in the PMP.

Quality Assurance Specialist, Ammunition Surveillance (QASAS)
Department of the Army civilians that function in the ammunition surveillance program at DOD installations, activities, and commands that receive, store, maintain, issue, use, and dispose of ammunition.

Quality Assurance Surveillance Plan (QASP)
All service contracts require the development and implementation of a QASP. A QASP describes how government personnel will evaluate and assess contractor performance. The purpose of the QASP is to describe how project performance will be measured and assessed against performance standards. It is based on the premise that the contractor, not the government, is responsible for managing quality control (QC).

Quality Control (QC)
The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established in the PMP; operational techniques and activities that are used to fulfill requirements for quality.

Quantity Distance (QD)
The quantity of explosives material and distance separation relationships that provide defined types of protection.

Real Property
Land, buildings, and bodies of water. Examples of such property include pads, pits, basins, ponds, streams, impact areas, maneuver areas, training areas, burial sites, and buildings used for ammunition or explosives operations.

Recovered Chemical Warfare Materiel (RCWM)
CWM used for its intended purpose or previously disposed of as waste, which has been discovered during a CWM response or by chance (e.g., accidental discovery by a member of the public), that DoD has either secured in place or placed under DoD control, normally in a DDESB-approved storage location or interim holding facility, pending final disposition.

Recovered Chemical Warfare Materiel (RCWM) Pre-Operational Survey
An exercise by the MACOM or designee performed at the beginning of chemical cleanup operations to determine the readiness of personnel to start those operations, and ensure compliance with all provisions of the site plan and safety submission and Army regulations.

Removal Action
The cleanup or removal of released hazardous substances from the environment. Such actions may be taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal

of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 9604(b), and any emergency assistance which may be provided under the *Disaster Relief and Emergency Assistance Act* [42 USC 5121 et seq.] The requirements for removal actions are addressed in 40 CFR §§300.410 and 300.415. The three types of removals are emergency, time-critical, and non time-critical removals. (*DoD Management Guidance for the DERP*)

Response Action (RA)
A CERCLA-authorized action involving either a short-term removal action or a long-term removal response. This may include, but is not limited to, removing hazardous materials, containing or treating the waste on-site, and identifying and removing the sources of ground water contamination and halting further migration of contaminants.

Restricted Area
Any area, usually fenced, at an establishment where the entrance and egress of personnel and vehicular traffic are controlled for reasons of safety.

Risk
The product of the probability or frequency that an accident will occur within a certain time and the accident's consequences to people, property or the environment.

Risk Acceptance
The management process of having the proper authority to review and accept risks.

Risk Assessment
The evaluation of the risk associated with an activity which may include one or more analysis methodologies.

Risk Decision
The decision to accept or not accept the risks associated with an action made by an individual responsible for performing that action.

Secondary Explosives
Secondary explosives are generally less sensitive to initiation than primary explosives and are typically used in booster and main charge applications. A severe shock is usually required to trigger a reaction. Examples are TNT, cyclo-1,3,5-trimethylene-2-4-6-trinitramine (RDX or cyclonite), HMX, and tetryl.

Service Magazine
A building of an operating line used for the intermediate storage of explosives materials.

Site Investigation
Activities undertaken to determine the presence, type, distribution, density, and location of MEC. Includes physical detection and identification of MEC as well as chemical sampling and monitoring.

Site Safety and Health Plan (SSHP)
An appendix to the APP that describes the site-specific practices.

Site Visit
Any visit to an MEC, or suspected MEC contaminated, site prior to any MEC operation.

Small Arms Ammunition (SAA)
Ammunition without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, including 20 millimeter, or for shotguns.

Stakeholder
Federal, state and local officials; community organizations; property owners and others having a personal interest or involvement, or having a monetary or commercial involvement in the property, which is to undergo MEC operations/activities.

Stand-by Construction Support
Construction UXO support provided, on an as-needed basis, where the probability of encountering MEC, or RCWM, has been determined to be low. This support can respond from offsite when called, or be onsite and available to provide required construction support.

Substantial Dividing Wall (SDW)
An interior wall designed to prevent simultaneous detonation of quantities of explosives on opposite sides of the wall.

Surveillance
The observation, inspection, investigation, test, study, and classification of ammunition, ammunition components, and explosives in movement, storage, and use with respect to degree of serviceability and rate of deterioration.

Surveillance Workshop Facility
A special building equipped to permit all normal ammunition surveillance inspections.

Team Separation Distance (TSD)
This is the distance that essential personnel must be separated by during the conduct of MEC activities on an MMRP site. Normally this is the K40 distance of the NEW of the MGFD for the site (MRS/MRA).

Time Critical Removal Action (TCRA)
Removal actions where, based on the project evaluation, a determination is made that a removal is appropriate, and that less than 6 months exists before on-site removal activity must begin (40 CFR 300.5).

Unexploded Ordnance (UXO)
Military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installation, properties (FUDS sites), per-

sonnel, or material and remain unexploded either by malfunction, design, or any other cause (10 U.S.C. 101(e)(5)(A) through (C))..

Unexploded Ordnance (UXO) and UXO-Related Operations/Activities/Procedures
See MEC-Related Operations.

Unexploded Ordnance (UXO) Qualified Personnel
Personnel who meet the training requirements for UXO personnel and have performed successfully in military EOD positions or are qualified to perform in the following service contract act contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, and Senior UXO Supervisor. Refer to DDESB TP 18 for detailed information for approved contract titles and qualifications.

Unexploded Ordnance (UXO) Sweep Personnel (UXOSP)
UXO sweep personnel assist UXO Technicians and UXO Qualified personnel in the performance of UXO-related activities. UXOSP do not have to be a UXO Technician, however they shall be provided job and site specific training. This training is identified in TP 18. UXOSP are not involved in the execution of explosives operations and shall not have intentional physical contact with MEC.

Unexploded Ordnance (UXO) Technicians
Personnel who are qualified for (as defined by DoD) and filling Department of Labor, Service Contract Act, Directory of Occupations contractor positions of UXO Technician I, UXO Technician II and UXO Technician III. Refer to DDESB TP 18 for detailed information for approved contract titles and qualifications.

Venting
Exposing any internal cavities of MPPEH, to include training or practice munitions (for example, concrete bombs), using DDESB- or DoD component-approved procedures, to confirm that an explosive hazard is not present.

Waiver
A written authority that permits a temporary deviation from a short term (five (5) years or less) mandatory requirement of U. S. Army AE safety standards. Existing waivers will not be renewed and will be replaced with a Certificate of Risk Acceptance if the hazard has not been rectified. All existing waivers will be replaced by 1 October 2011.

Weaponized
This term is used to denote the type of carrier used for chemical agent. If the carrier is a munition shell with a burster and fuze, the agent is said to be weaponized. If this is the case, and the filler is an industrial chemical (for example, CG, AC, CK) the munition is to be treated and handled as RCWM.

Work Plan (WP)
Describes procedures, goals, methods, and personnel used for MEC field activities, see EM 1110-1-4009.

BLANK