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.