



# Department of Defense MANUAL

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USD(AT&L)

**SUBJECT:** DoD Ammunition and Explosives Safety Standards: Criteria for Unexploded Ordnance, Munitions Response, Waste Military Munitions, and Material Potentially Presenting an Explosive Hazard

References: See Enclosure 1

## V7.1. PURPOSE

V7.1.1. Manual. This Manual is composed of several volumes, each containing its own purpose, and administratively reissues DoD 6055.09-STD (Reference (a)). The purpose of the overall Manual, in accordance with the authority in DoD Directives 5134.01 and 6055.9E (References (b) and (c)), is to establish explosives safety standards (hereafter referred to as “standards”) for the Department of Defense.

V7.1.1.1. These standards are designed to manage risks associated with DoD-titled ammunition and explosives (AE) by providing protection criteria to minimize serious injury, loss of life, and damage to property.

V7.1.1.2. Due to the size and complexity of this Manual, alternate paragraph numbering has been approved for use throughout. The initial numeric set (V#) refers to the volume number within the Manual; the second set (E#) refers to the enclosure number; and subsequent numbers refer to the section, paragraph, and subparagraph numbers. If there is no E#, the reference is to a section above the signature of the volume.

V7.1.2. Volume. This Volume provides criteria for unexploded ordnance (UXO), munitions response, waste military munitions, and material potentially presenting an explosive hazard (MPPEH).

## V7.2. APPLICABILITY. This Volume:

V7.2.1. Applies to:

V7.2.1.1. OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the Department of Defense (hereafter referred to collectively as the “DoD Components”).

V7.2.1.2. DoD-titled AE wherever it is located.

V7.2.1.3. DoD personnel and property when potentially endangered by known host-nation or off-installation AE hazards.

V7.2.1.4. DoD facilities siting and construction, except as indicated in paragraph V7.2.2.

V7.2.1.5. The evaluation of non-DoD explosives siting submissions on DoD installations (see section V4.E5.21.).

V7.2.2. Provided the documentation requirements of paragraph V7.E2.3.5. are met, does not apply to:

V7.2.2.1. Existing facilities, or those approved for construction under then-current editions of these standards. This exception applies for the balance of the useful lives of such facilities provided:

V7.2.2.1.1. The facility continues to be used for its intended purpose.

V7.2.2.1.2. The explosives safety hazards are not increased.

V7.2.2.1.3. Redesign or modification is not practicable.

V7.2.2.1.4. The quantity of AE cannot be reduced for reasons of operational necessity.

V7.2.2.2. Those planned facilities that do not meet these standards, but have been certified by the Heads of the DoD Components (see section V1.E3.4.) as essential for operational or other compelling reasons.

V7.2.2.3. Other situations that, upon analysis by the Heads of the DoD Components and the Department of Defense Explosives Safety Board (DDESB), are determined to provide the required degree of safety through use of protective construction or other specialized safety features.

### V7.3. DEFINITIONS

V7.3.1. Abbreviations and Acronyms. See Glossary.

V7.3.2. Terms. See Volume 8 of this Manual.

V7.4. POLICY. As established in Reference (c) and consistent with peacetime, contingency, or wartime operational requirements and corresponding DoD military munitions requirements from the broadest and most fundamental explosives safety management (ESM) perspective, it is DoD policy to:

V7.4.1. Provide the maximum possible protection to people and property from the potential damaging effects of DoD military munitions (explosive and chemical). Applying the standards herein provides only the minimum protection criteria for personnel and property, and greater protection should always be provided when practicable.

V7.4.2. Minimize exposures consistent with safe and efficient operations (i.e., expose the minimum number of people for the minimum time to the minimum amount of explosives or chemical agents (CAs)).

V7.5. RESPONSIBILITIES. See Enclosure 2.

V7.6. PROCEDURES. See Enclosures 3 through 6. Criteria provided in this Manual are given in English units (e.g., foot or feet (ft), pounds (lbs), pounds per square inch (psi)), with metric equivalents shown in brackets (e.g., meters (m), kilograms (kg), kilopascals (kPa)).

V7.7. RELEASABILITY. UNLIMITED. This Volume is approved for public release and is available on the Internet from the DoD Issuances Website at <http://www.dtic.mil/whs/directives>.

V7.8. EFFECTIVE DATE. This Volume is effective upon its publication to the DoD Issuances Website.

Enclosures

1. References
  2. Responsibilities
  3. UXO
  4. Real Property Known or Suspected to Contain MEC and CAs
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- Glossary

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ENCLOSURE 1

REFERENCES

- (a) DoD 6055.09-STD, "DoD Ammunition and Explosives Safety Standards," February 29, 2008 (cancelled by Volume 1 of this Manual)
- (b) DoD Directive 5134.01, Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), December 9, 2005
- (c) DoD Directive 6055.9E, "Explosives Safety Management and the DoD Explosives Safety Board," August 19, 2005
- (d) Department of Defense Explosives Safety Board, Technical Paper 15, "Approved Protective Construction," May 2010<sup>1</sup>
- (e) Department of Defense Explosives Safety Board, Technical Paper 16, "Methodologies for Calculating Primary Fragment Characteristics," April 1, 2009<sup>1</sup>
- (f) Section 1512 of title 50, United States Code
- (g) Management Guidance for the Defense Environmental Restoration Program (DERP) Guidance, Deputy Under Secretary of Defense for Installations & Environment (DUSD(I&E)), September 2001<sup>2</sup>
- (h) Section 2710 of title 10, United States Code
- (i) Department of Defense Explosives Safety Board, Technical Paper 18, "Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel," December 20, 2004<sup>1</sup>
- (j) DoD Instruction 4165.72, "Real Property Disposal," December 21, 2007
- (k) Subpart EE, parts 264 and 265; subpart M, part 266; and subpart 266.205 of title 40, Code of Federal Regulations
- (l) Section 6901 of title 42, United States Code
- (m) DoD Instruction 4140.62, "Material Potentially Presenting an Explosive Hazard," November 25, 2008

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<sup>1</sup> Available at <http://www.ddesb.pentagon.mil/techpapers.html>.

<sup>2</sup> Available at <https://www.denix.osd.mil/portal/page/portal/content/environment/cleanup/LA/Cleanup/guida.html>.

ENCLOSURE 2

RESPONSIBILITIES

V7.E2.1. UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY, AND LOGISTICS (USD(AT&L)). The USD(AT&L) shall provide overall policy guidance for the DoD Explosives Safety Management Program.

V7.E2.2. CHAIRMAN, DDESB. The Chairman, DDESB, shall report to the Deputy Under Secretary of Defense for Installations and Environment (DUSD(I&E)) and, on behalf of the USD(AT&L) and the DUSD(I&E), shall collaborate with the Military Service-appointed voting DDESB members to maintain explosives safety standards.

V7.E2.3. HEADS OF THE DoD COMPONENTS. The Heads of the DoD Components shall:

V7.E2.3.1. Implement these DoD explosives safety standards.

V7.E2.3.2. Comply with applicable Federal and State laws and regulations. Where this Manual conflicts with such laws and regulations, ensure the safety of DoD personnel and the public while complying and notify the Chairman, DDESB, through the Component's board member, of the conflict. These standards are not intended to be so rigid as to prevent the DoD Components from accomplishing their assigned missions.

V7.E2.3.3. Issue DoD Component guidance that implements these standards and provides DoD Component unique requirements.

V7.E2.3.4. Send a copy of any implementing and supplementary guidance to these standards to the Chairman, DDESB.

V7.E2.3.5. Document the exceptions described in paragraph V7.2.2. in permanent records. These records must include:

V7.E2.3.5.1. The effective date the applicable DoD explosives safety standards were first published.

V7.E2.3.5.2. The date the deviant facility was either approved, from an explosives safety viewpoint, for use or was first used in the deviating manner.

ENCLOSURE 3

UXO

V7.E3.1. SCOPE. This enclosure establishes standards to protect personnel and property from explosive and CA hazards (see Volume 6, Enclosure 4) associated with UXO or other military munitions, to include discarded military munitions (DMM), that have experienced abnormal environments. This enclosure's standards do not apply during contingencies, combat operations, and military operations other than war; however, these explosives safety principles should always be considered in such circumstances and applied as the situation allows.

V7.E3.2. GENERAL

V7.E3.2.1. UXO are considered the most dangerous category of military munitions. However, other military munitions, to include DMM, that are encountered outside the DoD munitions logistics management system, particularly those that have experienced an abnormal environment, should be considered equally dangerous and managed as UXO until assessed and determined otherwise by technically qualified personnel (i.e., explosive ordnance disposal (EOD) personnel, EOD-qualified U.S. Army Forces Command/20th Support Command/22nd Chemical Battalion personnel and, when specifically authorized by a DoD Component, UXO-qualified personnel). Military munitions that have experienced abnormal environments include, but are not limited to, munitions remaining after attempted demilitarization by open burning (OB) or open detonation (OD); munitions involved in accidents or fires; and munitions or components subjected to certain tests (e.g., fuze arming tests, jolt, and jumble tests) that might cause arming. U.S. Army Forces Command/20th Support Command/22nd Chemical Battalion is manned with specially trained personnel that provide verification, sampling, detection, mitigation, render safe, decontamination, packaging, escort, and remediation of chemical, biological, and industrial devices or hazardous materials.

V7.E3.2.1.1. UXO will most likely be found in areas that the Department of Department currently uses (e.g., operational ranges) or once used (e.g., former ranges) for military munitions training or testing. For a variety of reasons, UXO can also be encountered in other areas, to include where contingency, combat, or military operations other than war have occurred.

V7.E3.2.1.2. Munitions that may have experienced an abnormal environment might be encountered in areas where an accident or incident involving military munitions occurred; in areas that the Department of Defense uses or once used for OD of excess, obsolete, or unserviceable military munitions; or in other areas.

V7.E3.2.2. Positive identification of any potential explosive or CA hazards and consideration of the potential consequences of an intentional or accidental detonation is required before disposition of any recovered munitions. This is essential for munitions that might contain CAs that would pose a potential downwind CA hazard. Therefore, for both explosives and CA safety reasons, munitions found outside the Department of Defense's established logistical



munitions management systems (e.g., UXO, DMM) shall be managed as UXO until assessed, identified, and evaluated as to their explosive or CA hazards and determined otherwise by technically qualified personnel. Munitions that contain an unknown liquid fill shall also be managed as chemical warfare material (CWM) until assessed and the fill determined.

V7.E3.2.2.1. Only EOD personnel and, in some cases, U.S. Army Forces Command/20th Support Command/22nd Chemical Battalion personnel will respond to military or civilian authority requests for support to an explosives or munitions emergency.

V7.E3.2.2.2. For responses that either involve recovered chemical warfare material (RCWM) or munitions that contain an unknown liquid fill, U.S. Army Forces Command/20th Support Command/22nd Chemical Battalion personnel and, in cases where the munitions' physical characteristics allow positive identification, EOD personnel, are the only DoD personnel authorized to determine the most probable fill of such munitions. The determination as to whether certain munitions contain a CA fill is difficult, if not impossible, solely by visual inspection.

V7.E3.2.2.2.1. Many munitions have physical characteristics (e.g., shape, markings) that permit technically qualified personnel to rule out the potential for a CA fill. For example, a U.S.-manufactured 4-inch Stokes mortar's physical dimensions clearly indicate whether it contains a CA or explosive fill. However, the design or physical condition of some munitions may not allow their complete identification by visual inspection. This is especially true for used munitions and for munitions that have either experienced abnormal environments or been exposed to the elements (e.g., buried or submerged) for an extended period.

V7.E3.2.2.2.2. Munitions with an external design that does not always allow positive visual identification of their filler include, but may not be limited to: 4.2-inch mortars (M1, M2, and the M2A1 models) and Livens projectiles (MKII (M1) and MKIIAI) models. U.S. Army Forces Command/20th Support Command/22nd Chemical Battalion personnel and, in some cases, EOD personnel, are the only DoD personnel authorized to determine the most probable fill of these munitions.

V7.E3.2.3. Discovery of military munitions (e.g., UXO) outside the DoD munitions logistics management system might indicate, in some circumstances that a munitions response (see Enclosure 4 of this volume) or other protective measures are warranted. The DoD Components shall notify the Chairman, DDESB, and their respective Service-level explosives safety office of:

V7.E3.2.3.1. Repetitive explosives or munitions emergency responses to a discrete geographic area, where the circumstances surrounding the explosives or munitions emergency response are similar.

V7.E3.2.3.2. A single explosives or munitions emergency response that involves multiple military munitions (e.g., UXO, DMM, or RCWM) discovered at a discrete geographic area. Such discoveries might indicate that the area is a formerly used defense site (FUDS).

V7.E3.2.4. To meet the notification requirements of paragraph V7.E3.2.3., the DoD Components and the executive manager for EOD Technology and Training are encouraged to jointly work toward development of an explosives or munitions emergency response incident reporting system that will ensure all incidents are similarly reported and retained in a single DoD database, which can be queried, and will automatically identify the conditions of paragraph V7.E3.2.3.

### V7.E3.3. DISPOSITION OF UXO AND OF OTHER MILITARY MUNITIONS BEING MANAGED AS UXO

V7.E3.3.1. The Department of Defense is responsible for protecting people, property, and the environment from potential explosive hazards (e.g., blast and fragmentation) or CA hazards (e.g., downwind hazards) associated with DoD-owned UXO. The Department of Defense is equally responsible for protecting personnel who respond to address such hazards.

V7.E3.3.2. The DoD Components shall work collaboratively with environmental regulators and safety officials toward resolving, in a mutually agreeable manner, any concerns with the planned disposition of UXO during a response action; however, the protection of people, to include DoD response personnel, from the hazards associated with the discovered munitions and their disposition is paramount.

V7.E3.3.3. There are no safe procedures for moving, rendering safe, or destroying UXO, but merely procedures considered less dangerous. Destruction-in-place (also referred to as blow-in-place (BIP)) is the least dangerous; therefore, it is the preferred method of UXO destruction.

V7.E3.3.4. DoD response actions to address UXO must comply with these standards and other applicable DoD policies and with applicable Federal, State, interstate, and local laws and regulations, and any enforceable agreements. The DoD Components must ensure that, if not already in place, protective measures (e.g., site security) are implemented as quickly as practicable following discovery of UXO or other munitions outside the DoD munitions logistics management system. Should environmental regulators and safety officials have concerns regarding the sufficiency of the protective measures to be taken, these concerns should be raised to the appropriate-level DoD authority for resolution. Protective measures must be maintained throughout any delay caused by:

V7.E3.3.4.1. Compliance with laws, regulations, and agreements.

V7.E3.3.4.2. The need to address concerns raised by environmental regulators and safety officials about:

V7.E3.3.4.2.1. Methods for managing any potential adverse impacts (e.g., harming endangered species, damaging cultural resources) of implementing a pending BIP operation.

V7.E3.3.4.2.2. The use of alternative (to BIP) disposition methods.

V7.E3.3.4.3. Other factors (e.g., weather).

V7.E3.3.5. Military munitions known to contain CAs or that contain or are suspected to contain an unknown liquid fill will not normally be destroyed by OD because they pose potential downwind CA hazards. The responsible DoD Component (normally the Department of the Army), no lower than the Deputy Assistant Secretary level, may approve individual exceptions. Such exceptions should only be approved after discussions (see paragraph V7.E3.3.2.) with appropriate elected representatives, environmental regulators, and safety officials from those communities that could potentially be impacted by the munitions' disposition. The DoD Components must make sure that protective measures to ensure explosives safety are maintained during any delay in disposition.

V7.E3.3.6. UXO shall not be moved unless technically qualified personnel determine that the risks associated with movement are acceptable. During munitions responses, specifically authorized UXO-qualified personnel may make this determination. Although environmental regulators and safety officials recognize the expertise of DoD personnel involved in UXO disposition decisions, they may challenge a DoD field expert's decision and seek to elevate their concerns to higher levels of authority for resolution. (See paragraphs V7.E3.3.2. and V7.E3.3.4.)

V7.E3.3.6.1. If technically qualified personnel determine that the risk associated with movement is unacceptable, or if the munitions' condition precludes a complete assessment beyond positive identification of any potential explosive hazard or determination that it does not present a CA hazard, then it should be BIP.

V7.E3.3.6.2. In some circumstances, EOD personnel may determine that careful movement of a UXO, for a limited distance and using prescribed EOD procedures, is both necessary and allowed by EOD procedures. In such circumstances, destruction by detonation will occur in the general vicinity of discovery.

V7.E3.3.7. Under some circumstances, when BIP does not pose an immediate, certain, and unacceptable risk to people, critical operations, facilities, or equipment, environmental regulators and safety officials may seek collaboration (see paragraph V7.E3.3.2.) with the DoD Components to mutually agree to mitigation measures to reduce potential impacts of the pending BIP to public safety, the environment, and cultural resources. (See paragraph V7.E3.3.4.)

V7.E3.3.8. When BIP poses an immediate, certain, and unacceptable risk to people, critical operations, facilities, or equipment, EOD personnel may determine that render safe procedures (RSPs) should be attempted.

V7.E3.3.8.1. Because the application of RSPs exposes EOD personnel to added risks (greater than BIP), the application of RSPs shall only be attempted in limited circumstances.

V7.E3.3.8.2. Should EOD personnel employ RSPs, protective measures shall be applied to mitigate potential explosive effects and, when necessary, a possible CA release.

V7.E3.3.8.3. Only EOD personnel are authorized to conduct RSPs.

V7.E3.3.8.4. EOD personnel shall perform RSPs per Joint Service EOD Technical Data.

V7.E3.3.8.4.1. Conflicts between this Manual and the Joint Service EOD Technical Data should be raised to the Chairman, DDESB, and to the Joint EOD Program Board for resolution.

V7.E3.3.8.4.2. When the condition of UXO (e.g., crushed, bent, broken, mangled) precludes strict adherence to published procedures, onsite EOD personnel will determine and perform the procedure—established or innovative—that will have the most probable degree of success to render the munitions safe while mitigating potential explosive or, when necessary, CA effects.

V7.E3.3.9. The onsite EOD supervisor or, in the case of munitions responses, the UXO safety officer, shall ensure that the detonation site is inspected after each detonation or any misfire. No one shall be allowed within minimum separation distance (MSD) from the detonation site until the onsite EOD supervisor or UXO safety officer declares the area is safe.

V7.E3.3.10. When EOD personnel or, in the case of munitions responses, authorized UXO-personnel, positively identify UXO as to its explosive hazard and determine it safe to dispose of by other than BIP or immediate destruction by detonation, either in the general vicinity of discovery or at a designated location, then technically qualified personnel or an appropriate-level DoD authority with the advice of technically qualified personnel may evaluate a variety of safe disposition alternatives and options for managing any potentially adverse impact of the selected disposition alternative. (See paragraph V7.E3.3.2.)

#### V7.E3.4. SPECIAL CONSIDERATIONS

##### V7.E3.4.1. Disassembly and Inerting Operations

V7.E3.4.1.1. Disassembly and inerting operations shall not be conducted without proper authorization.

V7.E3.4.1.2. The DoD Components must establish procedures for authorizing such operations.

##### V7.E3.4.2. Construction Support

V7.E3.4.2.1. Construction support may be required during intrusive activities (e.g., laying or repairing utilities, improving roads) on property known or suspected to contain UXO or DMM.

V7.E3.4.2.2. The responsible authority (e.g., installation commander or designated representative) shall determine the level of construction support required on a case-by-case basis. Construction support is determined by the probability of encountering UXO or DMM.

V7.E3.4.2.2.1. Low Probability. EOD personnel or UXO-qualified personnel must be contacted to ensure their availability, advised about the project, and placed “on call” to assist if suspected UXO are encountered during construction. Discoveries of UXO or DMM on such sites require reassessment of the level of support required.

V7.E3.4.2.2.1.1. 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 that UXO or other munitions and explosives of concern (MEC) are present is low.

V7.E3.4.2.2.1.2. Munitions-related activities that may merit a “low” determination include, but are not limited to, the 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 being 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 a previous response has been completed, pursuant to a DDESB-approved explosives safety submission (ESS), for the stipulated reuse also qualify for “low” determinations.

V7.E3.4.2.2.2. Moderate to High Probability. EOD personnel or UXO-qualified personnel must attempt to identify and remove any explosive or CA hazards in the construction footprint prior to any intrusive construction activities.

V7.E3.4.2.2.2.1. A “moderate to high” determination may be assigned to those areas for which a search of available historical records or onsite investigation data indicates that, given the military or munitions-related activities that occurred at the site, there is more than a low probability that UXO or other MEC are present.

V7.E3.4.2.2.2.2. Munitions-related activities that may merit a “moderate to high” determination include, but are not limited to, the use of the area for live-fire training other than exclusively with small arms ammunition (e.g., munitions containing high-explosive projectiles); as operational range impact areas; for OB or OD of excess, obsolete, or unserviceable munitions; as munitions operating facilities where processes used might have resulted in the generation of concentrations of munitions constituents high enough to present an explosive hazard; for munitions burial; or for any activities involving possible disposition of CWM.

V7.E3.4.3. Anomaly Avoidance. Anomaly avoidance techniques must be employed on properties known or suspected to contain UXO or DMM to avoid surface UXO and, when necessary, subsurface anomalies.

V7.E3.4.3.1. When anomaly avoidance is used during training (e.g., maneuver training, live-fire training), testing, or operational range management activities conducted on such properties, the commander responsible for such activities will ensure:

V7.E3.4.3.1.1. A risk assessment to evaluate the potential hazards associated with the proposed activities is completed and methods to mitigate any potential exposures are implemented.

V7.E3.4.3.1.2. Training in anomaly avoidance, explosives safety and, when appropriate, CA safety training is provided to all personnel involved in the training, testing, or operational range management activities that access property known or suspected to contain UXO or DMM.

V7.E3.4.3.2. When anomaly avoidance is used during other than training or testing activities, or during activities involving other than operational range management activities:

V7.E3.4.3.2.1. Surface UXO must be avoided during any activities that require entry to the area (e.g., conducting cultural resource studies).

V7.E3.4.3.2.2. Surface UXO and subsurface anomalies must be avoided during any intrusive work (e.g., drilling environmental monitoring wells).

V7.E3.4.3.2.3. Escort support must be provided by EOD personnel or:

V7.E3.4.3.2.3.1. Within areas known or suspected to contain UXO, excluding CAs, regardless of configuration, by:

V7.E3.4.3.2.3.1.1. UXO-qualified personnel.

V7.E3.4.3.2.3.1.2. 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.

V7.E3.4.3.2.3.2. Within areas known or suspected to contain CAs, regardless of configuration, to include areas where such CA is commingled with other UXO, by UXO-qualified personnel trained in CWM responses.

V7.E3.4.3.2.4.. During anomaly avoidance:

V7.E3.4.3.2.4.1. Discovered surface UXO must be avoided and their locations noted and reported to appropriate authorities.

V7.E3.4.3.2.4.2. Detected subsurface anomalies that must not be investigated shall be marked, when appropriate, and avoided.

V7.E3.5. ACCESS TO AREAS KNOWN OR SUSPECTED TO CONTAIN UXO. To ensure explosives and CA safety risk is identified and controlled on real property currently or formerly under the jurisdiction, custody, or control of a DoD Component, the DoD Components must:

V7.E3.5.1. Prohibit unnecessary access (e.g., livestock grazing, recreational uses such as hunting and hiking) and take appropriate action to deter unauthorized access to areas under DoD control that are known or suspected to contain UXO or other munitions that have experienced abnormal environments.

V7.E3.5.1.1. Access to such areas, particularly operational range impact areas, shall be limited to personnel who have an operational requirement to enter such areas (e.g., range maintenance, environmental monitoring, and security). A risk assessment to evaluate the potential hazards associated with the proposed activity shall be completed and methods to mitigate any potential exposures shall be implemented before allowing access.

V7.E3.5.1.2. Actions to prohibit or deter access may include establishing access controls (e.g., fencing the area, establishing roving security patrols) and providing public notifications (e.g., posting UXO hazard warning signs, conducting UXO safety education programs) of any potential hazards. When used, signs must be legible and, when appropriate, multilingual or pictograms.

V7.E3.5.2. When the Department of Defense does not control the area (e.g., FUDS), at a minimum, provide written notification to the property owner and, if known, any tenants of the potential explosive and CA hazards present. A record of this notification must be maintained in permanent records.

V7.E3.5.3. Assume the following areas contain UXO or other munitions that have experienced abnormal environments:

V7.E3.5.3.1. Operational range impact areas, to include their associated safety zones (e.g., caution area, safety buffer zone). Exceptions include, but are not limited to, ranges used exclusively for training with small arms ammunition.

V7.E3.5.3.2. Ranges (sites) used for OB or OD of excess, obsolete, or unserviceable munitions.

V7.E3.5.3.3. Former impact areas and former OB or OD sites, unless documentation exists to show that they were adequately cleared during range closure or that an appropriate munitions response has been completed. In some cases, because these former impact areas or former OB or OD sites may have transferred from DoD control, the Department of Defense's ability to restrict access may be limited or nonexistent. In such cases, the responsible DoD Component shall, at a minimum, ensure that:

V7.E3.5.3.3.1. The property owner is provided written notification of the potential explosives and CA hazards and the risks inherent in any use of property that is inconsistent with those hazards.

V7.E3.5.3.3.2. A public UXO safety education program is implemented, when appropriate.

V7.E3.5.4. On DoD property, prohibit construction in areas known or suspected to contain UXO or DMM without required:

V7.E3.5.4.1. Construction or UXO avoidance support. (See paragraphs V7.E3.4.2. or V7.E3.4.3.)

V7.E3.5.4.2. Approved ESS, chemical safety submission (CSS), or site plan for munitions responses. (See Enclosure 4 of this Volume.)

V7.E3.5.5. Provide, or in the case of owners or tenants of non-DoD controlled property, offer explosives safety and, when appropriate, CA safety training to all individuals authorized access to DoD property known or suspected to contain UXO.

V7.E3.5.6. Develop guidelines to determine when individuals, who for operational reasons (e.g., environmental monitoring), are authorized access to areas under DoD control that are known or suspected to contain UXO, must be escorted into the area in accordance with (IAW) subparagraph V7.E3.4.3.2.3.

V7.E3.5.7. Establish UXO safety education programs to educate DoD personnel, their dependents, and private citizens that live near areas known or suspected to contain UXO about explosive hazards and, when appropriate, CA hazards associated with UXO, and with the risks associated with trespassing on operational ranges or with entering areas known or suspected to contain UXO.

V7.E3.5.8. Prior to changing the use of a property known or suspected to contain UXO or munitions that have experienced abnormal environments to a use that is incompatible with their presence:

V7.E3.5.8.1. For operational ranges, perform an appropriate range clearance, whether changing to a similar (e.g., converting an impact area to a hand grenade range) or dissimilar use (e.g., changing a range to a maneuver area).

V7.E3.5.8.2. For areas on DoD property, other than operational ranges, perform an appropriate munitions response.

V7.E3.5.8.3. For property not under DoD control, upon learning of a proposed change in use or pertinent munitions response action, offer to engage in munitions response activities only to the extent necessary to ensure planned response actions afford protectiveness from an explosives and CA safety perspective. The DoD engagement in such munitions response activities may be limited to explosives safety experts providing basic guidance and advice during applicable deliberations, decision making, and approval activities unless additional DoD services



are arranged through contractual or reimbursement mechanisms between the DoD Components and other responsible parties.

V7.E3.6. IDENTIFICATION AND CONTROL. To ensure explosives and CA safety risk is identified and controlled on real property currently or formerly under the jurisdiction, custody, or control of a DoD Component, the DoD Components must create and maintain permanent records required by paragraph V7.E4.2.2. When an operational range is closed or an installation is deactivated, the DoD Component concerned must designate the office to transfer these records to ensure their permanent retention.

#### V7.E3.7. MSD FOR UXO

V7.E3.7.1. The MSD for intentional detonations (see Volume 5, Enclosure 3, which may be reduced if supported by a hazard assessment or when using approved engineering controls (ECs) listed in EOD publications (for explosives or munitions emergency responses), DDESB Technical Paper 15 (Reference (d)), or other DDESB-approved ECs (for munitions responses), is the greatest distance of:

V7.E3.7.1.1. Blast overpressure, as computed by using the formula:  $D = 328W^{1/3}$  [ $D=130.16Q^{1/3}$ ].

V7.E3.7.1.2. The calculated maximum fragment distance (MFD), as provided in DDESB Technical Paper 16 (Reference (e)).

V7.E3.7.1.3. The appropriate downwind hazard distance for CAs.

V7.E3.7.2. The MSD for unintentional detonations (see Volumes 3, 4, and 5), which may be reduced if supported by a hazard assessment or when approved ECs are employed, for:

V7.E3.7.2.1. Nonessential Personnel. The greatest distance of:

V7.E3.7.2.1.1. Blast overpressure, as computed by using the formula:  $D = 40W^{1/3}$  [ $D=15.87Q^{1/3}$ ].

V7.E3.7.2.1.2. The calculated MFD, as provided in Reference (e). Lesser distances may be used if supported by a hazard assessment; however, in no case will the distance be less than the hazardous fragment distance (HFD) as provided in Reference (e); the exception is when approved ECs are used.

V7.E3.7.2.1.3. The appropriate downwind hazard distance for CAs.

V7.E3.7.2.2. Team Separation Distance (TSD). The greatest distance of:

V7.E3.7.2.2.1. Blast overpressure, as computed by the formula:  $D = 40W^{1/3}$  [D=15.87Q<sup>1/3</sup>].

V7.E3.7.2.2.2. The appropriate downwind hazard distance for CAs.

#### V7.E3.8. OTHER CONSIDERATIONS

V7.E3.8.1. Transportation. All transportation must comply with the requirements of applicable Federal, State, interstate, and local laws, and all implementing regulations relating to transportation of solid waste, hazardous substances, hazardous materials, and toxic substances.

V7.E3.8.1.1. UXO. Before UXO that may pose an explosive or CA hazard may be transported or shipped over public transportation routes, EOD personnel must determine whether the UXO is safe for transport. (For MPPEH, see subparagraph V7.E6.3.3.2.) A determination that the UXO is safe for transport must be documented in the EOD incident report. A copy of the incident report must accompany the shipment.

V7.E3.8.1.2. RCWM. Before RCWM may be transported or shipped, it must be assessed by the Army Material Assessment Review Board as safe for transport and packaged in an overpack container specifically designed and approved by the Army and by the Department of Transportation (DoT) for the transport of RCWM. (See subparagraph V7.E4.5.9.6.) In addition, the specific notifications and concurrences required in section 1512 of title 50 United States Code (U.S.C) (Reference (f)) must be met.

V7.E3.8.2. Firefighting Involving Areas Known or Suspected to Contain UXO or DMM. (See Volume 1, Enclosure 10.)

V7.E3.8.2.1. Advanced planning is essential for firefighting operations involving areas that are known or suspected to contain UXO or DMM or CA hazards. Coordination of such plans between firefighters and explosives safety personnel or EOD personnel and, when appropriate, CA safety professionals, is essential.

V7.E3.8.2.2. Senior firefighting personnel should carefully assess whether to fight a fire involving areas that are known or suspected to contain explosive or CA hazards. Factors to consider include, but are not limited, to: the types of munitions that might be present; the safety of firefighting personnel and of the public; the potential loss of critical assets; and the duration and intensity of the fire.

V7.E3.8.2.2.1. When the decision is made not to fight such fires, the area should be evacuated and remain so until it has cooled for at least 24 hours. (See paragraph V1.E10.5.2.)

V7.E3.8.2.2.2. When the decision is made to fight such fires, all firefighters involved in fighting the fire should be provided basic safety training for fighting fires involving military munitions.

V7.E3.8.3. Controlled Burns

V7.E3.8.3.1. Burning vegetation to facilitate safe UXO clearance or removal operations is permitted, provided proper safeguards are in place to protect all personnel from unintentional detonations. These burns must be carefully planned and executed to manage explosives safety risks and environmental effects. During such burning operations, all personnel shall be at MFD from the burning or burned area, based on the munition with the greatest fragmentation distance (MGFD), and shall remain out of the area until it has cooled for at least 24 hours.

V7.E3.8.3.2. Controlled burns will not be performed on areas known or suspected to contain CWM.

V7.E3.8.4. Technology

V7.E3.8.4.1. Explosives safety is a paramount consideration when determining the most appropriate technologies to be used to detect, excavate, remove, and dispose of UXO and other munitions that present an explosive hazard.

V7.E3.8.4.2. The use of remotely operated equipment (e.g., excavators, sifters, and shredders) or other standoff technologies (e.g., lasers) may offer the safest approach for excavating and destroying UXO and should be considered.

V7.E3.8.4.3. Subparagraph V7.E4.5.8.3.5. addresses mechanized UXO processing operations.

ENCLOSURE 4

REAL PROPERTY KNOWN OR SUSPECTED TO CONTAIN MEC AND CAs

V7.E4.1. SCOPE. This enclosure:

V7.E4.1.1. Establishes explosives safety standards that, when applied, will protect people and real property from explosive and CA hazards associated with:

V7.E4.1.1.1. Real property known or suspected to contain:

V7.E4.1.1.1.1. MEC.

V7.E4.1.1.1.2. CAs in other than munitions configurations (e.g., DoD laboratory vials, CA identification sets, one-ton containers, CA-contaminated soil).

V7.E4.1.1.2. Munitions responses to MEC. (A munitions response to CA-filled munitions will be addressed as a CWM response.)

V7.E4.1.1.3. CWM responses.

V7.E4.1.2. Establishes a process for determining site-specific actions that, when taken, will:

V7.E4.1.2.1. Ensure explosives safety is addressed throughout munitions responses to MEC.

V7.E4.1.2.2. Ensure CA safety and, when applicable, explosives safety is addressed throughout CWM responses.

V7.E4.1.2.3. Result in DDESB approval of required safety submissions for munitions responses to MEC and for CWM responses. (See section V7.E4.5. for required safety submission and their contents.)

V7.E4.1.2.4. Document and report completion of:

V7.E4.1.2.4.1. Munitions responses to MEC.

V7.E4.1.2.4.2. CWM responses.

V7.E4.1.3. Does not apply to:

V7.E4.1.3.1. Operational ranges, with the exception of military munitions burial sites located on such ranges.

V7.E4.1.3.2. Explosives or munitions emergency responses.

V7.E4.2. EXPLOSIVES SAFETY STANDARDS FOR THE IDENTIFICATION AND CONTROL OF AREAS KNOWN OR SUSPECTED TO CONTAIN MEC OR CAs. To ensure explosives and CA safety risk is identified and controlled on real property currently or formerly under the jurisdiction, custody, or control of a DoD Component, the DoD Components must:

V7.E4.2.1. Identify all areas known or suspected to present explosive or CA hazards (Geographic Information Systems) should be used:

V7.E4.2.1.1. In installation master plans for active installations. (In some cases, these areas are also required to be identified in other documents.)

V7.E4.2.1.2. In the DoD Military Munitions Response Site Inventory for those sites that are included in the Military Munitions Response Program (see Management Guidance for the Defense Environmental Restoration Program (DERP) (Reference (g)) and section 2710(a) of title 10 U.S.C. (Reference (h))).

V7.E4.2.2. Maintain permanent records of those areas identified pursuant to paragraph V7.E4.2.1. and ensure such records are readily available to current and future users of the property. Records should be retained for areas such as operational ranges, former ranges, current or former munitions manufacturing facilities, current or former sites used for munitions demilitarization activities, and locations previously used for the burial of munitions. Records shall:

V7.E4.2.2.1. When practicable, include the nomenclature and the known or suspected location.

V7.E4.2.2.2. Summarize any clearance or response (removal or remediation) actions, or explosives or munitions emergency responses previously conducted within the area.

V7.E4.2.3. Prohibit unnecessary access and take appropriate action to deter unauthorized access to areas under DoD control that are known or suspected of containing potential explosive or CA hazards. Such actions may include establishing access controls (e.g., fencing the area, establishing roving security patrols), which may be risk-based, or providing public notifications of any potential hazards (e.g., posting UXO-hazard warning signs, conducting UXO-safety education programs). When used, signs must be kept legible and, when appropriate, in the predominant languages of the region, or as pictograms. When the Department of Defense does not exercise jurisdiction, custody, or control over the area (e.g., FUDS), the responsible DoD Component shall, at a minimum, provide written notification of the potential explosive or CA hazards to the property owner and any known tenants. A record of this notification must be maintained as a permanent record. (See paragraph V7.E4.2.2.)

V7.E4.2.3.1. The DoD Components should, unless there is evidence to the contrary, assume the following areas present explosive hazards:

V7.E4.2.3.1.1. Impact areas on operational ranges. Exceptions are ranges known to have been exclusively used for training with only small arms ammunition.

V7.E4.2.3.1.2. Former ranges known or suspected to contain MEC.

V7.E4.2.3.1.3. Outdoor demolition areas, to include locations used for OB or OD.

V7.E4.2.3.1.4. Areas that are associated with military munitions production, demilitarization, renovation, or similar processes (e.g., operating buildings and any installed equipment) that generated explosives residues (e.g., dust, vapors, liquids) and that might have become contaminated with such residues in concentrations sufficient to present explosive hazards, to include areas receiving processing wastewater (e.g., settling ponds, drainage swales).

V7.E4.2.3.2. The DoD Components should, unless there is evidence to the contrary, assume the following areas present CA hazards:

V7.E4.2.3.2.1. Former CWM or CA burial sites.

V7.E4.2.3.2.2. Former CWM or CA disposal areas.

V7.E4.2.3.2.3. Former CWM impact areas.

V7.E4.2.3.2.4. Former training areas used for training with CWM or CAs.

V7.E4.2.3.2.5. Former CWM or CA production and demilitarization facilities.

V7.E4.2.3.3. When access to areas known or suspected to present explosive or CA hazards is necessary, a risk assessment to evaluate the potential hazards associated with the proposed activity shall be completed and methods to mitigate any potential exposures shall be implemented before access is allowed. When access is necessary to real property not under DoD ownership, custody, or control, the DoD Component should obtain a right of entry for the property.

V7.E4.2.4. Prohibit the disposal (e.g., burying, dumping) of military munitions on land or in water except when specifically authorized by the DoD Component. Such disposal actions must comply with applicable regulatory requirements. This prohibition does not preclude:

V7.E4.2.4.1. The covering of munitions with earth to control fragments and noise during authorized destruction by detonation.

V7.E4.2.4.2. The use of *in situ* capping when implemented as an engineered remedy under an authorized response action.

#### V7.E4.3. EXPLOSIVES AND CA SAFETY ASPECTS OF RESPONSE ACTIONS

V7.E4.3.1. General

V7.E4.3.1.1. Plans for munitions responses to MEC or CWM responses shall:

V7.E4.3.1.1.1. Ensure close coordination, as applicable, between DoD explosives and CA safety organizations, DoD environmental organizations, and appropriate regulatory agencies and stakeholders.

V7.E4.3.1.1.2. Specify those actions necessary to protect DoD personnel, installation-related personnel, and the public from exposure to explosive and CA hazards.

V7.E4.3.1.1.3. Provide the design for and explain the execution of:

V7.E4.3.1.1.3.1. Munitions responses, when MEC has been determined to present an unacceptable risk.

V7.E4.3.1.1.3.2. CWM responses, when a CA, regardless of configuration, has been determined to present an unacceptable risk.

V7.E4.3.1.1.4. Explain how the selected response actions will achieve a degree of protectiveness necessary for the current, determined, or reasonably anticipated future land use.

V7.E4.3.1.1.4.1. Provide the rationale for selection of technologies to be used to detect anomalies that can indicate the presence of MEC or CAs, regardless of CA configuration.

V7.E4.3.1.1.4.2. Address how periodically (e.g., during 5-year reviews or consistent with long-term monitoring agreements) completed response actions will be reviewed to ensure the response remains effective. The need for such reviews is particularly important in areas where natural phenomena (e.g., frost heave, soil erosion, droughts, or tidal action) could expose MEC or CAs, regardless of CA configuration, or where land use controls (LUCs) constitute a major element of the response. These reviews shall consider:

V7.E4.3.1.1.4.2.1. The explosives safety aspects of munitions responses to MEC.

V7.E4.3.1.1.4.2.2. The CA safety and, when applicable, the explosives safety aspects of CWM responses.

V7.E4.3.1.1.5. Address how the personnel qualification provisions of DDESB Technical Paper 18 (Reference (i)) will be met.

V7.E4.3.1.1.6. Be approved by the DDESB for compliance with these standards.

V7.E4.3.1.1.7. Provide for the submission of an after action report (AAR) to the DDESB upon completion of the response. AARs are not provided for DDESB approval, but are used to close out files maintained by the DDESB Staff.

V7.E4.3.1.2. The following pertain to residual explosive and CA hazards:

V7.E4.3.1.2.1. Some areas that the military has used for munitions-related activities (e.g., live-fire training or testing, OB or OD) or for CA-related activities may not be appropriate, even after the performance of response activities, for certain uses (e.g., residential development). Such areas include former military range impact areas on which the military has used munitions containing either high explosives or CAs and sites used for either OB or OD. Such areas may, after a response, be better suited for uses that restrict or limit intrusive activities (e.g., wildlife refuges, surface recreational areas).

V7.E4.3.1.2.2. Some MEC or CAs, regardless of CA configuration, might not be detected or removed during a response. Although residual risks can be managed (e.g., by use of agreed-upon LUC, to include safety education; recurring reviews; and construction support), residual hazards might still exist.

V7.E4.3.1.2.3. From an explosives and, when applicable, CA safety perspective, the degree to which MEC or CA removal is undertaken depends largely on the current, determined, or reasonably anticipated future land use. When MEC or CAs, regardless of CA configuration, cannot be removed to the degree necessary to safely allow the current, determined, or reasonably anticipated future land use, the use must be changed or appropriately restricted to obtain DDESB approval of the relevant plan.

V7.E4.3.1.3. When DoD does not control the land and the imposition of LUC is not possible (e.g., on FUDS), the responsible DoD Component should, at a minimum, provide the property owner, and any known tenants, written notification of the potential residual explosive or CA hazards and the risks inherent in any use of property that is inconsistent with those hazards.

V7.E4.3.2. Explosives Safety and CA Safety Aspects in the Selection and Design of Responses. Explosives safety must be addressed in the selection and design of a munitions response to MEC. CA safety, and when applicable, explosives safety must be addressed in the selection and design of a CWM response. The protection afforded by a response must be consistent with the current, determined, or reasonably anticipated land use. The design of the response that is included in the required submission must consider the following site-specific information:

V7.E4.3.2.1. Historical Information. Historical information, which is documented in a written report, is gathered through a records search, to include the permanent records outlined in section V7.E4.2., and interviews. The following information is required:

V7.E4.3.2.1.1. The boundaries of the response area. For munitions responses, the munitions response area (MRA) boundaries and, when appropriate, the boundaries of any munitions response sites (MRSs) (e.g., firing points, impact areas, and burial sites) within the MRA are required.



V7.E4.3.2.1.2. The type of MEC known or suspected to be present based on the types of munitions-related operations, training, or testing previously performed in the MRA or MRS.

V7.E4.3.2.1.3. The type and configuration of any CA known or suspected to be present.

V7.E4.3.2.2. Land Use. Land use is the current, determined, or reasonably anticipated future use of real property. Because portions of the response area (e.g., the MRA or MRS) might be used differently (e.g., public highway, wildlife refuge, sports field, industrial complex), different responses actions (e.g., surface removal, subsurface removal, no removal, remedial response) may be appropriate within any given response area.

V7.E4.3.2.2.1. Where the land use is, or will be, limited to surface activities, the munitions or CWM response may only involve removing surface MEC or surface CAs (i.e., a surface removal). This removal may be technology aided.

V7.E4.3.2.2.2. When the land use will involve or allow intrusive activities to occur, the response will normally require a subsurface removal, and may require follow-on construction support.

V7.E4.3.2.2.3. Where the current, determined, or reasonably anticipated land use is compatible with the explosive or CA hazards present or suspected, a response action to remove any explosive or CA hazard may not be necessary.

V7.E4.3.2.2.4. Where a response would adversely impact natural or cultural resources, a removal action may not be practical.

V7.E4.3.2.3. Results of Onsite Investigations. These results should be used to validate and augment information discovered during the historical review and to determine the specific boundaries of the response area (e.g., the boundary of an MRA or of any MRS within an MRA).

V7.E4.3.2.4. Analysis. A detailed analysis of available records, technical data, and the results of onsite investigations. This analysis should evaluate:

V7.E4.3.2.4.1. The types of MEC or CAs, regardless of CA configuration, known to be present, to include its technical characteristics (e.g., filler, fuzing) and estimated distribution.

V7.E4.3.2.4.2. The potential explosive or CA hazards present.

V7.E4.3.2.4.3. Physical site characteristics (e.g., flora and fauna (including endangered species), cultural, geological, topographical, hydrological).

V7.E4.3.2.4.4. Persons potentially endangered.

V7.E4.3.2.4.5. Information from previous or current responses.

V7.E4.3.2.5. LUCs. The appropriateness and effectiveness of LUCs to manage any residual explosives safety or CA safety risks.

V7.E4.3.2.6. Technology. The applicability, capabilities, and limitations of available technologies (e.g., detection, discrimination, removal).

V7.E4.3.2.7. Other Relevant Factors.

#### V7.E4.4. SPECIAL CONSIDERATIONS

##### V7.E4.4.1. Explosive Soil

V7.E4.4.1.1. Because of some past munitions-related activities (e.g., settling ponds or explosives sumps at munitions production or demilitarization facilities), concentrations of explosives in soil (e.g., sand, sludge, clay) can exist such that the mixture itself presents an explosive hazard. Such mixtures are referred to as “explosive soil.”

V7.E4.4.1.2. The net explosive weight for quantity-distance (NEWQD) of explosive soil is the weight of the mixture multiplied by the explosives concentration (e.g., 1,000 lbs [454 kg] of explosive soil that is 10 percent trinitrotoluene (TNT) has an NEWQD of 100 lbs [45.4 kg]).

V7.E4.4.1.3. The concentration necessary to present an explosive hazard depends on the distribution and type of explosives in the soil and the soil’s characteristics.

##### V7.E4.4.1.3.1. Primary (Initiating) Explosives

V7.E4.4.1.3.1.1. Soil containing 2 percent or more by weight of any primary explosive or mixture of primary explosives presents an explosive hazard and shall be treated as hazard division (HD) 1.1.

V7.E4.4.1.3.1.2. Soil containing less than 2 percent by weight of any primary explosive does not present an explosive hazard.

##### V7.E4.4.1.3.2. Secondary Explosives

V7.E4.4.1.3.2.1. Secondary explosives are much less sensitive than primary explosives.

V7.E4.4.1.3.2.2. Soil containing 10 percent or more by weight of either any secondary explosives or a mixture of secondary explosives presents an explosive hazard and shall be treated as HD 1.1.

V7.E4.4.1.3.2.3. Soil containing less than 10 percent by weight of any secondary explosive or a mixture of secondary explosives does not present an explosive hazard.

V7.E4.4.1.3.3. Nitroglycerin, Nitrocellulose, and Nitroguanidine

V7.E4.4.1.3.3.1. Soil containing 10 percent or more by weight of nitroglycerin, nitrocellulose, or nitroguanidine presents an explosive hazard and shall be treated as HD 1.1.

V7.E4.4.1.3.3.2. Soil containing less than 10 percent by weight of nitroglycerin, nitrocellulose, or nitroguanidine does not present an explosive hazard. Care must be taken when applying this threshold rule to less-permeable soils, such as clay, that may cause nitroglycerin to pond, rather than be absorbed.

V7.E4.4.1.3.4. Other Energetic Materials Mixtures. The potential explosive hazard of such mixtures in soil may be unknown and may require testing. If the hazard is unknown, manage soil mixtures containing only propellants as secondary explosives, and all other soil mixtures containing energetics (e.g., liquid propellants) as primary explosives.

V7.E4.4.2. Real Property (Buildings and Installed Equipment). Military munitions operating buildings (e.g., munitions production or demilitarization facilities) and any installed equipment may contain residual explosives that present an explosive hazard. Of particular concern are building features (e.g., floors, roofs, walls, drains, internal and external piping, ventilation systems) in which explosives residues could present explosive hazards and industrial equipment, particularly equipment with internal cavities from facilities used in munitions production or demilitarization operations (e.g., cast loading or milling, steam-out) that generated explosives residues (e.g., dust, vapors, liquids). To the extent such buildings or installed equipment is believed to present an explosive or CA hazard, the DoD Components must submit to the DDESB for review and approval the explosives or CA safety provisions of any required plans for transfer or use of such buildings and installed equipment before use or transfer for purposes incompatible with the presence of the explosive hazard (see Enclosure 6 of this Volume).

V7.E4.4.3. Construction Support

V7.E4.4.3.1. The DoD Components should consider the level of construction support required, based on site-specific data, during the following activities:

V7.E4.4.3.1.1. Intrusive activities (e.g., building construction, laying utilities, or road improvements) on property known or suspected to contain MEC or CAs, regardless of CA configuration, or on property on which residual explosive or CA hazards may exist.

V7.E4.4.3.1.2. The removal or remediation of debris or media in areas where there is a probability of encountering MEC (e.g., former OB or OD grounds) or CAs.

V7.E4.4.3.2. The responsible authority (e.g., installation commander or designated representative) will determine whether such support is required and the level of effort of required support on a case-by-case basis (see paragraph V7.E4.5.7.). Construction support is determined by the probability of encountering MEC or CAs, regardless of CA configuration.

V7.E4.4.3.2.1. Low Probability. “On-call” construction support is appropriate.

V7.E4.4.3.2.1.1. 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 CAs, regardless of CA configuration, is low.

V7.E4.4.3.2.1.2. 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.

V7.E4.4.3.2.1.3. Immediate reassessment by the responsible authority of the level of construction support required is appropriate upon the discovery of MEC or CAs, regardless of CA configuration.

V7.E4.4.3.2.2. Moderate to High Probability. “Onsite” construction support should be provided to remove explosive or CA hazards in the construction footprint, per a DDESB-approved ESS or CSS, before intrusive construction or other intrusive activities occur. When the depth of intrusive activities exceeds the detection limits of the detection equipment used, soil should be removed in layers to allow detection and removal of MEC or CAs, regardless of CA configuration, in the construction footprint.

V7.E4.4.3.2.2.1. A “moderate to high” determination may be assigned to those areas for which a search of available historical records or onsite investigation data indicates that, given the military or munitions-related activities that occurred at the site, there is more than a low probability that MEC or CAs are present.

V7.E4.4.3.2.2.2. Munitions-related activities that may merit a “moderate to high” determination include, but are not limited to, the former use of the area for live-fire training other than exclusively with small arms ammunition; as operational range impact areas; for OB or OD of munitions; as munitions operating facilities where processes used might have resulted in the generation of concentrations of munitions constituents high enough to present an explosive hazard; for munitions burial; or for any activities involving CAs.

V7.E4.4.4. Anomaly Avoidance

V7.E4.4.4.1. The use of anomaly avoidance techniques is appropriate on properties known or suspected to contain UXO or other munitions (e.g., DMM) that may have experienced abnormal environments to allow the activities in subparagraphs V7.E4.4.4.1.1. and

V7.E4.4.4.1.2. in such areas while avoiding surface explosive or CA hazards and, when necessary, subsurface anomalies. Anomaly avoidance is used when:

V7.E4.4.4.1.1. Surface MEC or CAs, regardless of CA configuration, will be avoided during any activities that require entry to the area (e.g., collections of environmental samples, the conduct of cultural resource studies).

V7.E4.4.4.1.2. Subsurface anomalies will be avoided during any intrusive work (e.g., drilling environmental monitoring wells).

V7.E4.4.4.2. During anomaly avoidance:

V7.E4.4.4.2.1. Escort support must be provided by EOD personnel, or:

V7.E4.4.4.2.1.1. Within areas known or suspected to contain MEC, excluding CAs, regardless of configuration, by:

V7.E4.4.4.2.1.1.1. UXO-qualified personnel.

V7.E4.4.4.2.1.1.2. 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.

V7.E4.4.4.2.1.2. Within areas known or suspected to contain CAs, regardless of configuration, to include areas where such CA is commingled with other MEC, by UXO-qualified personnel trained in CWM responses.

V7.E4.4.4.2.2. Explosives safety requires that discovered surface MEC or CAs, regardless of CA configuration, be avoided and their location noted and reported to appropriate authorities.

V7.E4.4.4.2.3. Detected subsurface anomalies must not be investigated, but they shall be marked, when appropriate, and avoided.

V7.E4.4.5. Frost Heave. This phenomenon occurs when three conditions are met: (a) freezing temperatures are present in the soil column; (b) the soil is frost susceptible; and (c) there is sufficient moisture present in the soil to cause soil movement upon ice crystal formation. These three factors will be evaluated to assess the likelihood of frost heave moving residual MEC or CAs, regardless of CA configuration, upward through the soil column. Where frost heave may have such an effect, explosives safety requires procedures be implemented to monitor the effectiveness of response actions for the affected area. Other naturally occurring phenomena (e.g., erosion, tidal changes) could necessitate similar monitoring.

V7.E4.4.6. Soil Containing CAs

V7.E4.4.6.1. The criteria in subparagraphs V7.E4.4.6.3. through V7.E4.4.6.7. apply to soil known to be contaminated with one or more of the following CAs: mustard, dichloro (2-chlorovinyl) arsine (common name is Lewisite) (L), pinacolyl methylphosphonofluoridate (common name is soman) (GD), dimethylaminoethoxy-cyanophosphine oxide (common name is tabun) (GA)/isopropyl methylphosphonofluoridate (common name is sarin) (GB), o-cyclohexyl methylphosphono-fluoridate (GF) (common name is cylcosarin), or 0-ethyl S-[2-(diisopropylamino) ethyl] methylphosphonothioate (VX). These criteria apply only if a headspace measurement is at or above the short-term exposure limits (STELs) (see subparagraph V7.E4.4.6.4.1.) or a laboratory extraction sample is at or above the hazardous waste control limit (HWCL) for solid materials: mustard, L, GD, GA/GB, GF, or VX. Certain CA-related operations, such as taking core samples at a suspect CWM or CA burial site, require laboratory extraction sampling.

V7.E4.4.6.2. Soil for which no evidence exists of CA contamination does not require treatment or remediation.

V7.E4.4.6.3. An appendix to the site's Site Safety and Health Plan that addresses the procedures (e.g., personnel protection, monitoring, sampling, packaging, and disposal) for the handling and disposition of CA-contaminated soil is required for environmental responses to soil known or suspected to be contaminated with CAs.

V7.E4.4.6.4. Air-sampling methods will be used to detect CAs during CWM responses. When soil contaminated with CAs is encountered and an air concentration is at or above the STEL based on off-gas monitoring of the headspace of a container or of air in the immediate area of the operation, appropriate personnel protective measures shall be employed and the CA-contaminated soil shall be decontaminated to below the HWCL levels of subparagraph V7.E4.4.6.4.2. unless the CA-contaminated soil may be shipped per DoT regulations and approvals and a receiving Treatment Storage Disposal Facility is qualified to process the CA-contaminated soil per Federal, State, interstate, and local laws and regulations. If air monitoring is below the STEL, soil samples will be taken to determine if the soil exceeds the HWCL.

V7.E4.4.6.4.1. The STELs for air sampling CA contamination are:

V7.E4.4.6.4.1.1. 0.003 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) for mustard agent (2,2' dichlorodiethyl sulfide (common name is distilled mustard) (H/HD) or 60 percent HD and 40 percent 2,2' dichloroethylthiodiethyl ether (common name is mustard-T mixture) (H/HT)).

V7.E4.4.6.4.1.2. 0.003  $\text{mg}/\text{m}^3$  for L.

V7.E4.4.6.4.1.3. 0.0002  $\text{mg}/\text{m}^3$  for GD/GF.

V7.E4.4.6.4.1.4. 0.0001  $\text{mg}/\text{m}^3$  for GA/GB.

V7.E4.4.6.4.1.5. 0.00001  $\text{mg}/\text{m}^3$  for VX.

V7.E4.4.6.4.2. When soil contaminated with CAs is encountered at or above the HWCL levels listed in Table V7.E4.T1. as determined by laboratory extraction and analysis of soil samples, the CA-contaminated soil shall be decontaminated to below the levels listed for the HWCL, or to a level required by Federal, State, interstate, and local laws and regulations.

Table V7.E4.T1. HWCLs

Standard Name	Population	Exposure Scenario	CA Per Soil Mass (mg/kg)					
			GD/GF	GA	GB	VX	H/HD & H/HT	L
HWCL	Worker (Civilian/DoD)	Possible occasional exposure at hazardous waste treatment facility	52	680	320	10	6.7	37

V7.E4.4.6.5. Once decontaminated to the appropriate level, the CA-contaminated waste must be packaged in a DoT-approved shipping container and shipped to an approved, licensed treatment or disposal facility per Federal, State, and local laws and regulations. Records of disposition must be maintained by the generator per Federal, State, interstate, and local laws and regulations.

V7.E4.4.6.6. Soil that is found to be below the HWCL, but above the levels of subparagraph V7.E4.4.6.7., shall be disposed of as hazardous waste per Federal, State, interstate, and local laws and regulations or treated by an approved, licensed treatment or disposal facility to the levels of subparagraph V7.E4.4.6.7.

V7.E4.4.6.7. Soil that is at or below the health-based environmental screening levels (HBESLs) for residential or industrial soil listed in Table V7.E4.T2., as appropriate, may be used or disposed of per Federal, State, interstate, and local laws and regulations (e.g., returned to the hole or disposed of as non-contaminated, non-hazardous material).

Table V7.E4.T2. HBESLs

Standard Name	Population	Exposure Scenario	CA Per Soil Mass (mg/kg)					
			GD/GF	GA	GB	VX	H/HD & H/HT	L
HBESL - Residential	General Population (adults and children)	Daily Exposure (lifetime)	0.22	2.8	1.3	0.042	0.01	0.3
HBESL - Industrial	General Adult Population	Frequent Exposures (250 days per year for 30 years)	5.2	68	32	1.1	0.3	3.7

V7.E4.5. REQUIRED SAFETY SUBMISSIONS (ESS, CSS, AND EXPLOSIVES OR CWM SITE PLANS)

V7.E4.5.1. Requirements. Explosives and CA safety requires:

V7.E4.5.1.1. A DDESB-approved site plan, ESS, or CSS before the start of munitions response activities (e.g., field activities) that involve the placement of explosives on a site; the intentional physical contact with MEC or CAs, regardless of CA configuration; or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain MEC or CAs, regardless of CA configuration; or

V7.E4.5.1.2. A Service-level explosives safety office review and approval pending DDESB review and approval of the submission, provided the submission is at the DDESB for review and approval and the Service accepts that the DDESB approval may impose different or additional munitions or CWM response requirements.

V7.E4.5.2. DDESB Approval Required. A DDESB-approved ESS or CSS, or an explosives or CWM site plan, or a combination thereof, is required for:

V7.E4.5.2.1. MRS investigation or characterization (e.g., Engineering Evaluation/Cost Analysis or Remedial Investigation/Feasibility Study) that involves the intentional physical contact with MEC or CAs, regardless of CA configuration (see paragraph V7.E4.5.4.).

V7.E4.5.2.2. A determination of “no DoD action indicated” (NDAI) or “no further action” (NOFA) (see paragraph V7.E4.5.5.).

V7.E4.5.2.3. Time critical removal action (TCRA) (see paragraph V7.E4.5.6.).

V7.E4.5.2.4. Construction support (see paragraph V7.E4.5.7.).

V7.E4.5.2.5. Execution of the explosives safety or CA safety aspects of the selected response (see paragraphs V7.E4.5.8. and V7.E4.5.9.).

V7.E4.5.3. DDESB Approval Not Required. A DDESB-approved ESS or CSS, or an explosives or CWM site plan is not required for:

V7.E4.5.3.1. Munitions or explosives emergency responses.

V7.E4.5.3.2. Preliminary assessments or site inspections (e.g., site visits in conjunction with an archival search) when intentional physical contact with MEC or CAs, regardless of CA configuration, or the conduct of ground-disturbing or other intrusive activities are not intended (see subparagraph V7.E4.5.3.6.).

V7.E4.5.3.3. Clearance activities on operational ranges. (Addressing military munitions burial sites on operational ranges is not a clearance activity.)



V7.E4.5.3.4. Munitions responses on former ranges used exclusively for training with small arms ammunition.

V7.E4.5.3.5. On-call construction support.

V7.E4.5.3.6. Anomaly avoidance activities.

V7.E4.5.4. MRS Investigation or Characterization. An explosives or, when appropriate, a CWM site plan is required for MRS investigations or characterizations that involve intentional physical contact with MEC or CAs, regardless of CA configuration. Such site plans will address areas (e.g., magazines) used for the storage of commercial or military demolition explosives, MEC or CAs, regardless of CA configuration; planned or established demolition or disposal areas; and the MRA, MRS, or response area boundaries. (See subparagraph V7.E4.5.8.3.7.) MRS investigation and characterization are used to collect the information needed to design the required munitions response and to prepare, as appropriate, an ESS or CSS for the selected response.

V7.E4.5.5. NDAI or NOFA ESS or CSS. When a NDAI or NOFA decision is made for an MRA or MRS or for a response area, an ESS or CSS must, at a minimum, provide:

V7.E4.5.5.1. The site identification (e.g., name, unique identifier).

V7.E4.5.5.2. The site location.

V7.E4.5.5.3. Justification for the decision.

V7.E4.5.6. TCRA ESS or CSS. To expedite the approval process, the DoD Components are encouraged to submit a TCRA ESS or CSS electronically through their chain of command to the DDESB. A TCRA ESS or CSS must, at a minimum, identify or provide:

V7.E4.5.6.1. The site identification (e.g., name, unique identifier).

V7.E4.5.6.2. The TCRA's location.

V7.E4.5.6.3. The TCRA's purpose, in sufficient detail to explain the reason the TCRA was authorized.

V7.E4.5.6.4. The estimated date that the TCRA will be:

V7.E4.5.6.4.1. Initiated.

V7.E4.5.6.4.2. Completed.

V7.E4.5.6.5. The MGF.

V7.E4.5.6.6. Explosives safety quantity-distance (ESQD) maps (see subparagraph V7.E4.5.8.3.7.) that show the MSD for:

V7.E4.5.6.6.1. The removal area within an MRA or MRS or within a response area for:

V7.E4.5.6.6.1.1. Unintentional detonations (see subparagraph V7.E4.5.8.3.2.1.).

V7.E4.5.6.6.1.2. Intentional detonations (see subparagraph V7.E4.5.8.3.2.2.).

V7.E4.5.6.6.2. Areas or magazines for the storage of demolition explosives, MEC, or CAs, regardless of CA configuration.

V7.E4.5.6.7. Actions and controls to be implemented (e.g., surface removal, evacuation, fences) as part of the TCRA.

V7.E4.5.6.8. DDESB-approved ECs (see Reference (d)) to be used, if any.

V7.E4.5.6.9. A point of contact for additional information.

V7.E4.5.7. Construction Support ESS or CSS. A safety submission is required for construction support where the probability of encountering MEC or CAs, regardless of CA configuration, is considered moderately or highly probable. This submission must provide the information outlined in paragraphs V7.E4.5.8. and V7.E4.5.9., as appropriate. The information may be tailored based on site-specific conditions.

V7.E4.5.8. Selected Munitions Response ESS. The information in subparagraphs V7.E4.5.8.1. through V7.E4.5.8.15. is required in an ESS for the execution of the selected munitions response to address MEC. When a CA, regardless of configuration, is known or suspected to be present along with explosive hazards, or when it is explosively configured, a submission that provides both explosives safety (as outlined in subparagraphs V7.E4.5.8.1. through V7.E4.5.8.15.) and CA safety information (see paragraph V7.E4.5.9.) is required.

V7.E4.5.8.1. Background. The ESS must provide, for informational purposes, a brief description of the reasons for the munitions response. The ESS must identify or provide:

V7.E4.5.8.1.1. The scope of munitions response activities.

V7.E4.5.8.1.2. Any significant differences in munitions response activities that will occur within the MRA or MRS. The ESS must identify significant differences in the current, determined, or reasonably anticipated future land use of different sections of the property, significant differences in the types or conditions of MEC expected to be encountered, and any sections of the MRA that will not require munitions response activities.

V7.E4.5.8.2. Maps. The following maps and related information must be furnished:

V7.E4.5.8.2.1. Regional Map. A map depicting the regional location of the MRA or MRS (e.g., a state or boundary illustration map with the MRA indicated on it).

V7.E4.5.8.2.2. MRA or MRS Maps. Maps of the area or areas at which the munitions response is planned. These maps and related information shall indicate:

V7.E4.5.8.2.2.1. Areas that:

V7.E4.5.8.2.2.1.1. Contain or are suspected of containing MEC that the ESS addresses.

V7.E4.5.8.2.2.1.2. Were suspected of containing MEC, but that research or site characterizations have subsequently shown do not contain such.

V7.E4.5.8.2.2.1.3. The ESS does not address, but that either a previous safety submission addressed or a future safety submission will address.

V7.E4.5.8.2.2.2. The current, determined, or reasonably anticipated future land use of property within the MRA or MRS that is known or suspected to contain MEC that the ESS addresses.

V7.E4.5.8.2.2.3. The ownership and land use of adjacent properties, as appropriate.

V7.E4.5.8.2.2.4. Any other situation that may influence or require consideration during the response (e.g., flight corridors, traffic routes).

V7.E4.5.8.3. ESQD

V7.E4.5.8.3.1. MEC Response-Related Operations Map. The planned locations for MEC response-related operations must be shown on ESQD maps. Preliminary site work, such as surveying, laying search lanes, and detecting anomalies does not require establishment of an ESQD arc.

V7.E4.5.8.3.2. ESQD Maps. ESQD arcs for both intentional and unintentional detonations must be established and shown on ESQD maps for each MRS.

V7.E4.5.8.3.2.1. The MSD for unintentional detonations, which may be reduced by employing the ECs listed in Reference (d) or other DDESB-approved ECs, for:

V7.E4.5.8.3.2.1.1. Nonessential personnel is the greatest distance of:

V7.E4.5.8.3.2.1.1.1. Blast overpressure, as computed by using the formula:  $D = 40W^{1/3}$  [ $D=15.87Q^{1/3}$ ].

V7.E4.5.8.3.2.1.1.2. The calculated HFD as provided in DDESB TP 16 (Reference (e)).

V7.E4.5.8.3.2.1.2. Essential personnel is the TSD, based on blast overpressure, as computed by the formula:  $D = 40W^{1/3}$  [ $D=15.87Q^{1/3}$ ].

V7.E4.5.8.3.2.2. The MSD for intentional detonations (see Volume 5, Enclosure 3), which may be reduced by employing the ECs listed in Reference (d) or other DDESB-approved ECs, is the greatest distance of:

V7.E4.5.8.3.2.2.1. Blast overpressure, as computed by using the formula:  $D = 328W^{1/3}$  [ $D=130.16Q^{1/3}$ ].

V7.E4.5.8.3.2.2.2. The calculated MFD, as provided in Reference (e).

V7.E4.5.8.3.3. MEC, Excluding CA-filled Munitions, Hazard Classification, and Storage

V7.E4.5.8.3.3.1. Recovered MEC, other than RCWM, shall be managed as HD 1.1, unless assigned differently by an Interim Hazard Classification authority, and assigned an appropriate CG. When storage at the MRA or MRS is necessary, recovered MEC must be stored separately from serviceable munitions and from any RCWM. (For RCWM, see subparagraph V7.E4.5.9.6.)

V7.E4.5.8.3.3.2. Nonessential personnel in structures shall be afforded protection equivalent to inhabited building distance (IBD) from storage locations. Nonessential personnel in the open shall be afforded protection equivalent to public traffic route distance from storage locations. (See Volumes 3 and 4.) There is no required ESQD protection for essential personnel from locations they are using for storage.

V7.E4.5.8.3.3.3. The intermagazine distance (IMD), based on the NEWQD of the munition with the greatest NEWQD that is reasonably expected to be encountered, applies from intrusive operations to storage sites to prevent propagation to a storage location in event of an accidental explosion during intrusive operations. For distances less than IMD, DDESB-approved ECs must be used during intrusive operations.

V7.E4.5.8.3.4. Planned or Established Demolition Areas. A planned or established demolition area is an area used repetitively to destroy munitions during a munitions response. Such areas may be an existing OD area or a new area planned for intentional detonation. An ESQD arc must be provided around demolition areas. The size of the ESQD arc will be based on requirements of this Manual (see Volume 5, Enclosure 3).

V7.E4.5.8.3.5. Mechanized MEC Processing Operations, Excluding CA-filled Munitions.

V7.E4.5.8.3.5.1. High- and Low-Input Operations. Mechanized MEC processing operations can be classified as either “high-input” or “low-input” based on a risk assessment that considers the degree of energy with which the process would impact any MEC potentially processed.

V7.E4.5.8.3.5.1.1. High-input processing operations (e.g., shredders, crushers) are intended to physically deform material including any MEC being processed and certain excavations depending upon the risk assessment.

V7.E4.5.8.3.5.1.2. Low-input processing operations (e.g., on-site transport, dumping, screening, raking, spreading, sifting, and magnetically separating) are not intended to intentionally deform material including MEC being processed and certain excavations depending upon the risk assessment.

V7.E4.5.8.3.5.2. Personnel Separation Distances

V7.E4.5.8.3.5.2.1. Nonessential Personnel

V7.E4.5.8.3.5.2.1.1. During high-input processing operations, nonessential personnel shall be provided protection for intentional detonations based on the MGFD. (See subparagraph V7.E4.5.8.3.2.2.)

V7.E4.5.8.3.5.2.1.2. During low-input processing operations, nonessential personnel shall be provided protection for accidental (unintentional) detonations (greater of HFD or K40).

V7.E4.5.8.3.5.2.2. Essential Personnel. For both high- and low-input processing operations, essential personnel shall:

V7.E4.5.8.3.5.2.2.1. Be protected by shields or barricades designed to defeat hazardous fragments from the MGFD.

V7.E4.5.8.3.5.2.2.2. Be separated from the operation by K24 [9.52] based on the munition with the greatest NEWQD that is reasonably expected to be encountered. DDESB-approved overpressure-mitigating ECs may be used to provide an equivalent level of protection (2.3 psi) [15.9 kPa].

V7.E4.5.8.3.6. Intentional Burning of Buildings Contaminated with Explosives Residues that Present an Explosive Hazard. All personnel shall be separated by K328 [130.1] overpressure distance based on the maximum credible event (MCE) for the building, but not less than 1,250 ft [381 m].

V7.E4.5.8.3.7. ESQD Maps. The ESQD arcs and the MRA and MRS boundaries may be shown on the same map provided all potential explosion sites (PESs) and exposed sites (ESs) are shown in sufficient detail.

V7.E4.5.8.3.7.1. ESQD maps should be to scale and legible per subparagraph V1.E5.1.3.3.2.

V7.E4.5.8.3.7.2. When a map does not contain a scale, all distances must be labeled.

V7.E4.5.8.3.7.3. The ESQD map shall show the following:

V7.E4.5.8.3.7.3.1. Each MRA or MRS.

V7.E4.5.8.3.7.3.2. The storage locations for demolition explosives and for recovered MEC.

V7.E4.5.8.3.7.3.3. Locations (planned or established) for the intentional detonations or burning of MEC, excluding CA-filled munitions. Such locations include areas where contained detonation technology will be used.

V7.E4.5.8.3.7.3.4. All ESs and PESs and their relationships. Describe any protective measures (e.g., evacuation of inhabited buildings, blocking off public highways) that will be used to eliminate or minimize any exposures within the established exclusion zone.

V7.E4.5.8.3.7.3.5. All controlling ESQD arcs.

V7.E4.5.8.3.7.4. ESQD arcs must be shown for:

V7.E4.5.8.3.7.4.1. Munitions. The MGFDF shall be used for ESQD purposes for any particular MRA or MRS. However, if a munition with a greater fragmentation distance is encountered during the conduct of a munitions response, the ESQD arcs must be adjusted and the ESS or explosives safety site plan must be amended.

V7.E4.5.8.3.7.4.2. Explosive Soil. To determine the ESQD arc for explosive soil, calculate the MCE by multiplying the weight of the mix by the concentration of explosives (e.g., 1,000 lbs [453.60 kg] of soil containing 15 percent TNT has an MCE of 150 lbs [68 kg]). When concentrations vary within the site, weighted averages or other valid mathematical technique can be used to determine the exclusion zone; however, the ESS must support their use. The MSD for nonessential personnel shall be the greater of IBD for overpressure or the soil ejecta radius per the Buried Explosion Module contained in Reference (e) or other DDESB-approved procedures (see Reference (d)).

V7.E4.5.8.3.7.4.3. Real Property (Buildings and Installed Equipment). For real property that is known or suspected to be contaminated with explosives residues that present an explosive hazard, and that is slated for cleanup or dismantlement, the MCE will be estimated on a case-by-case basis. The ESS shall include the rationale used for the estimation.

V7.E4.5.8.3.8. Soil Sampling Maps. When the property involves concentrations of explosives in the soil that are high enough to present an explosive hazard (see paragraph V7.E4.4.1.):

V7.E4.5.8.3.8.1. Provide a map that indicates areas that were determined to contain explosive soil.

V7.E4.5.8.3.8.2. Address methods (e.g., blending, bio-remediation) to be used to reduce explosives concentrations to a non-reactive level.

V7.E4.5.8.3.8.3. Address methods (e.g., wetting the soil before blending) to be used to reduce any explosive hazards.

V7.E4.5.8.4. Types of MEC. Based on research or data generated from characterization of the MRA or MRS, provide the types of MEC expected to be encountered during munitions response activities.

V7.E4.5.8.5. Start Date. Provide the expected date that munitions response activities that involve the placement of explosives on a site, the intentional physical contact with MEC, or the conduct of ground-disturbing or intrusive activities in areas known or suspected to contain MEC are scheduled to start. Indicate the potential consequence, if any, if DDESB approval does not occur by the start date. Site preparation activities (e.g., surveying, gridding, or locating anomalies) may be conducted while awaiting DDESB approval of an ESS.

V7.E4.5.8.6. MEC Migration. Describe naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal changes) that could cause the migration or exposure of MEC, and procedures for monitoring and managing such.

V7.E4.5.8.7. Detection Equipment and Response Techniques. The intent of the following requirements is to describe the capabilities of detection equipment relative to the degree of removal required to support the current, determined, or reasonably anticipated end use.

V7.E4.5.8.7.1. Describe the techniques to be used to detect and remove MEC.

V7.E4.5.8.7.2. Identify the types of detection equipment to be used and the areas in which they will be employed.

V7.E4.5.8.7.3. Summarize methods used (e.g., test plots) to establish the expected detection capabilities of the equipment used. If anomaly discrimination will be used, explain what methods will be used to establish the expected accuracy of the discrimination.

V7.E4.5.8.7.4. When describing the detection methods:

V7.E4.5.8.7.4.1. Describe the rationale (e.g., best available technology based on geology, topography, munitions characteristics, resource requirements) used to select the detection methods and technologies to be used during the response.

V7.E4.5.8.7.4.2. Address any limitations (e.g., equipment, terrain, soil type) and mitigating actions, if any.

V7.E4.5.8.7.4.3. Describe quality assurance and quality control (QA/QC) standards and pass or fail criteria for QA/QC control audits.

V7.E4.5.8.8. Disposition Techniques

V7.E4.5.8.8.1. MEC, Excluding CA-Filled Munitions

V7.E4.5.8.8.1.1. Briefly, describe the MEC, excluding CA-filled munitions, disposition techniques (e.g., OB, OD, contained detonation, incineration) to be used.

V7.E4.5.8.8.1.2. When recovered MEC, excluding CA-filled munitions, cannot be destroyed within the MRA or MRS, address how explosives safety requirements will be met during transportation and during offsite storage, treatment, or disposal. Disposition actions should consider requirements applicable to waste military munitions.

V7.E4.5.8.8.2. MPPEH. Describe the process to be used to manage MPPEH (see Enclosure 6 of this Volume).

V7.E4.5.8.9. Environmental, Ecological, Cultural and Other Considerations. Address any environmental, ecological (e.g., endangered species), cultural (e.g., tribal spiritual or gathering sites) and other factors that impacted, from an explosives safety perspective, the selection of the munitions response.

V7.E4.5.8.10. Technical Support. Summarize EOD, U.S. Army Forces Command/20th Support Command/22nd Chemical Battalion, or UXO-technician or UXO-qualified personnel support that may be required. U.S. Army Forces Command/20th Support Command/ 22nd Chemical Battalion is manned with specially trained personnel that provide verification, sampling, detection, mitigation, render safe, decontamination, packaging, escort, and remediation of chemical, biological and industrial devices or hazardous materials.

V7.E4.5.8.11. Residual Risk Management. Address:

V7.E4.5.8.11.1. LUCs. The ESS must summarize any LUCs to be implemented and maintained on the property.

V7.E4.5.8.11.2. Long-term Management. The ESS must address how any potential residual risks will be managed.

V7.E4.5.8.12. Safety Education Program. Address methods to be used to educate the public on the risks associated with MEC and CAs, regardless of CA configuration.



V7.E4.5.8.13. Stakeholder Involvement. Briefly, summarize how stakeholder concerns affecting the explosives safety aspects of the selected munitions response were addressed.

V7.E4.5.8.14. Contingencies. To reduce the need to submit amendments (see paragraph V7.E4.6.1.), an ESS may describe alternative actions that could be used to address contingencies. As an example, an ESS may list alternative DDESB-approved ECs (see Reference (d)) that may be used under specified conditions.

V7.E4.5.8.15. Unexpected CA Discoveries. Should a CA, regardless of its configuration, be discovered during munitions responses to MEC, excluding CA-filled munitions, all onsite activities shall be halted until the need for a CWM response is evaluated and a decision is approved by the Service-level explosives safety office. If it is decided that a CWM response is necessary, response actions that involve the intentional physical contact with a CA, regardless of configuration, or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain CAs shall not begin until the required CSS or CWM site plan is approved by the DDESB.

#### V7.E4.5.9. Selected CWM Response CSS and CWM Site Plans

##### V7.E4.5.9.1. General

V7.E4.5.9.1.1. A response in an area (e.g., a munitions response in an MRA or MRS) that is known or suspected to contain CAs, regardless of configuration, must include a CWM site plan for an interim holding facility (IHF) and, when the use of onsite destruction technology is planned, for the site at which those destruction activities will occur. Generally, the information required in a CSS parallels that for an ESS (see paragraph V7.E4.5.8.); however, such information will be tailored to address CWM.

V7.E4.5.9.1.2. A CSS is not required for certain activities on a site with a history of CA-related activities when an installation or district commander, or a command-designated representative, has approved a probability assessment finding for such activities stating that the probability of discovering CAs is expected to be “seldom” or “unlikely.” However, the site safety and health plan must include contingency plans providing for the safe and expeditious evacuation of the site in the event a CA is discovered. Should CAs, regardless of configuration, be discovered during these activities, all onsite activities shall be halted until the need for a CWM response is evaluated and a decision is approved by the Service-level explosives safety office. If it is decided that a CWM response is necessary, response actions that involve the intentional physical contact with a CA, regardless of configuration, and/or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain CAs shall not begin until the required CSS or CWM site plan is approved by the DDESB.

V7.E4.5.9.2. Explosives Hazards. When explosives hazards are known or suspected to exist along with CA hazards within a response area (e.g., the MRA or MRS), a submission that addresses both explosives safety (see paragraph V7.E4.5.8.) and CA safety (as outlined in paragraphs V7.E4.5.9.3. through V7.E4.5.9.15.) is required.

V7.E4.5.9.3. Background. (See subparagraph V7.E4.5.8.1.)

V7.E4.5.9.4. Maps. The maps provided with a CSS must meet the requirements of subparagraph V7.E4.5.8.2. In addition, the One Percent Lethality Distance and the IBD shall be shown.

V7.E4.5.9.5. CA Hazards. When CA hazards are known or suspected to exist within a response area (e.g., the MRA or MRS), the CA downwind hazard must be considered when determining the MSD. The CSS shall provide the following information:

V7.E4.5.9.5.1. A description of the CA MCE.

V7.E4.5.9.5.2. A description of how essential and nonessential personnel and the public will be protected should the CA MCE occur (see Volume 6, Enclosure 4 for basic personnel protection requirements (e.g., hazard zones and protective equipment) for operations involving CWM). If an EC, which has not been DDESB-approved, is to be used to provide such protection, the CSS must include the technical data substantiating the new EC's effectiveness. ECs may be used for:

V7.E4.5.9.5.2.1. Protection from overpressure and fragments when explosively configured CWM are known or suspected.

V7.E4.5.9.5.2.2. Protection from CA effects (prevent vapor releases to the environment) during both response activities and when RCWM is stored in the IHF.

V7.E4.5.9.6. RCWM Hazard Classification and Storage

V7.E4.5.9.6.1. RCWM, suspected or confirmed, regardless of its configuration, must be stored separately from serviceable munitions and from other MEC. Additionally, suspect RCWM shall be stored separately from all other munitions and from RCWM.

V7.E4.5.9.6.2. Suspect and known RCWM shall be managed as HD 1.1 until stowed in an approved overpack container or until determined not to be RCWM (see subparagraph V7.E4.5.8.3.3.) or to be non-explosively configured RCWM (see subparagraph V7.E4.5.9.6.4.). The CA downwind hazard must be considered, with the greater of the two distances used for siting purposes.

V7.E4.5.9.6.3. Explosively configured RCWM in an approved overpack container shall be managed as HD 1.2.1 with an explosive MCE of one round or HD 1.2.2, based on its NEWQD. Such storage may be considered HD 1.1 if advantageous for computing HFD using DDESB-approved procedures. (See Reference (e).) The CA downwind hazard must be considered, with the longer of the two distances used for siting purposes.

V7.E4.5.9.6.4. Non-explosively configured RCWM shall be managed as HD 6.1. The CA downwind hazard must be used for siting purposes.

V7.E4.5.9.7. CWM Site Plan. A DDESB-approved CWM site plan for an IHF is required when a CA, regardless of configuration, is known or suspected to exist on a response area. The IHF site plan, which is based on the worst-case CA configuration expected to be encountered, is included in the CSS. The IHF site plan shall:

V7.E4.5.9.7.1. Identify the public access exclusion distance (PAED).

V7.E4.5.9.7.2. Identify all associated ESQD arcs (see subparagraph V7.E4.5.8.3.).

V7.E4.5.9.7.3. Address the evacuation procedures for personnel within the PAED.

V7.E4.5.9.7.4. Address any security measures and access controls for the IHF.

V7.E4.5.9.7.5. Address any EC that will be used to mitigate a CA release during IHF activities, such as:

V7.E4.5.9.7.5.1. Static storage within the IHF.

V7.E4.5.9.7.5.2. RCWM assessment activities (e.g., X-ray, portable isotopic neutron spectroscopy).

V7.E4.5.9.7.5.3. Transportation preparation activities (e.g., transloading of multiple round containers (MRCs), MRC movement into or out of the IHF).

V7.E4.5.9.7.6. Address soil sampling maps. (See subparagraph V7.E4.5.8.3.8.).

V7.E4.5.9.7.7. Address types of CAs. (See subparagraph V7.E4.5.8.4.).

V7.E4.5.9.7.8. Address start date. (See subparagraph V7.E4.5.8.5.).

V7.E4.5.9.8. Detection Equipment and Response Techniques. (See subparagraph V7.E4.5.8.7.)

V7.E4.5.9.9. Disposition Techniques

V7.E4.5.9.9.1. CA, Regardless of Configuration

V7.E4.5.9.9.1.1. Briefly, describe the disposition techniques (e.g., onsite destruction) to be used.

V7.E4.5.9.9.1.2. When RCWM cannot be destroyed on site, address how CA safety and, if applicable, explosives safety requirements will be met during transportation and offsite storage, treatment, or disposal. Disposition actions should consider guidance applicable to waste military munitions.

V7.E4.5.9.9.2. MPPEH. Describe the process to be used to manage MPPEH. (See Enclosure 6 of this Volume.)

V7.E4.5.9.10. Environmental, Ecological, Cultural, and Other Considerations. (See subparagraph V7.E4.5.8.9.)

V7.E4.5.9.11. Technical Support. (See subparagraph V7.E4.5.8.10.)

V7.E4.5.9.12. Residual Risk Management. (See subparagraph V7.E4.5.8.11.)

V7.E4.5.9.13. Safety Education Program. (See subparagraph V7.E4.5.8.12.)

V7.E4.5.9.14. Contingencies. (See subparagraph V7.E4.5.8.14.)

V7.E4.5.9.15. Unexpected MEC or Explosively Configured CWM Discoveries. Should unexpected MEC or explosively configured CWM be discovered during a CWM response, all onsite activities that involve intentional physical contact with such MEC or explosively configured CWM, or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain such MEC or explosively configured CWM, shall be halted until the newly identified explosive hazards are evaluated and the DDESB approves all required CSS amendments or explosives site plans.

V7.E4.6. AMENDMENTS AND CORRECTIONS. An amendment or correction to an approved ESS or CSS does not require the resubmission of the complete ESS or CSS package. However, the information submitted must be in sufficient detail to identify the specific ESS or CSS being amended or corrected, the affected portions, and the precise amendments or corrections.

V7.E4.6.1. Amendments. Amendments are only required when a change to an approved ESS or CSS increases explosives safety or CA risks, identifies requirements for additional or increased explosive or CA hazard controls, or increases or decreases an ESQD arc.

V7.E4.6.1.1. An amendment requires DDESB approval before the affected response actions can continue. However, response actions need not be stopped pending such approval provided:

V7.E4.6.1.1.1. The amendment pertains to an area (e.g., MRA or MRS) for which an ESS or CSS has already been approved; and

V7.E4.6.1.1.2. The DoD Component:

V7.E4.6.1.1.2.1. Institutes protective measures (e.g., increased ESQD, use of DDESB-approved EC) to address any explosive or CA hazards.

V7.E4.6.1.1.2.2. Accepts the possibility that the DDESB approval process may impose different or additional explosives safety or CA safety requirements.

V7.E4.6.1.2. If the amendment is for a new response area (e.g., a new MRS), then the DDESB must approve the amendment before intrusive activities begin in the new response area.

V7.E4.6.1.3. To allow the response to continue with minimal interruption, amendments should be processed by electronic means.

V7.E4.6.1.4. Changes that require an amendment include:

V7.E4.6.1.4.1. Constraints in funding, technology, access, and other site-specific conditions that impact the degree of removal addressed in the approved ESS or CSS.

V7.E4.6.1.4.2. Any increase or decrease of the ESQD arcs.

V7.E4.6.1.4.3. A change in operations requiring explosives siting or re-siting of an IHF for CWM.

V7.E4.6.1.4.4. Changes in LUCs or long-term management to address residual risks. Such changes would not require intrusive activities to stop while the amendment is being processed.

#### V7.E4.6.2. Corrections

V7.E4.6.2.1. Address changes to an approved ESS or CSS that do not increase explosives safety or CA risks or exposures.

V7.E4.6.2.2. Do not require approval.

V7.E4.6.2.3. Are primarily administrative in nature and provided for information purposes.

#### V7.E4.7. AAR

V7.E4.7.1. An AAR for completed munitions or CWM responses is a required feature of all DDESB-approved ESSs or CSSs. The AAR's purpose is to document that the explosives and chemical safety aspects of the selected response have been completed per the approved ESS or CSS. In most cases, a "Statement of MEC Removal" or "Statement of Munitions Response MEC Removal Actions" fulfills the requirements in subparagraphs V7.E4.7.2.4. through V7.E4.7.2.8. The DDESB Staff shall acknowledge receipt of an AAR, and raise any issues that require resolution before land transfer or an alternative use can safely proceed.

V7.E4.7.2. The AAR:

V7.E4.7.2.1. Shall be submitted to the DDESB through the responsible DoD Component.

V7.E4.7.2.2. May be submitted electronically.

V7.E4.7.2.3. Will remain part of the DDESB's action file; however, the DoD Components continue to be responsible for complying with all recordkeeping requirements.

V7.E4.7.2.4. Shall summarize the MEC or CAs, regardless of CA configuration, found.

V7.E4.7.2.5. Shall describe the relative effectiveness and any limitations of the technologies used during the munitions response or CWM response and the effects on residual risk relative to that originally projected.

V7.E4.7.2.6. Shall include maps showing:

V7.E4.7.2.6.1. Areas from which MEC or CAs, regardless of CA configuration, were removed.

V7.E4.7.2.6.2. Areas within a response area (e.g., within an MRA or MRS) where response actions were not performed and the rationale for not addressing those areas.

V7.E4.7.2.6.3. The known or reasonably anticipated end use of each area.

V7.E4.7.2.7. Shall summarize the LUCs that were implemented, if any, and the areas to which they apply.

V7.E4.7.2.8. Shall address provisions for long-term management.

V7.E4.8. TRANSFER OF REAL PROPERTY OUTSIDE OF DoD CONTROL. Pursuant to DoD Instruction 4165.72 (Reference (j)), real property known to contain or suspected of containing explosive or CA hazards may not be transferred out of DoD control (other than to the Coast Guard) until the Chairman, DDESB, has approved measures submitted by the transferring Component to ensure the recipient of the property is fully informed of both the actual and potential hazards relating to the presence or possible presence of explosives or CAs, and restrictions or conditions placed on the use of the property to avoid harm to users due to the presence of explosives or CAs.

V7.E4.8.1. Notices. A recipient of such DoD property shall be provided:

V7.E4.8.1.1. Details of any past removal or remedial actions, including:

V7.E4.8.1.1.1. The degree of MEC or CA removal.

V7.E4.8.1.1.2. The process used to determine that degree of removal to be adequately protective.

V7.E4.8.1.2. Written notification that detection and removal methods are not 100 percent effective, and that residual hazards may remain in areas (e.g., MRS) that were subjected to response actions.

V7.E4.8.2. Restrictions and Conditions. Based on potential explosive and CA hazards present and the projected use of the property, the following types of use restrictions and conditions shall be imposed, as appropriate, on such DoD property:

V7.E4.8.2.1. A prohibition on excavation or drilling in any areas known or suspected to contain MEC or CAs, regardless of CA configuration, without appropriate permits or assistance.

V7.E4.8.2.2. A prohibition on disturbing, removing, or destroying any found MEC or CAs, regardless of CA configuration.

V7.E4.8.2.3. A requirement to immediately notify local law enforcement representatives of any discovery of MEC or CAs, regardless of configuration.

V7.E4.8.2.4. A prohibition on the construction or installation of particular improvements including utilities, roadways, airstrips, navigable waterways, pipelines, and structures, both above and below ground.

V7.E4.8.2.5. A prohibition on specific alterations, extensions, or expansions to such improvements.

V7.E4.8.2.6. A prohibition on certain types of uses, such as childcare centers, housing, or farming.

V7.E4.8.2.7. A restriction to a specific type of use or owner, such as a state National Guard range.

V7.E4.8.2.8. Inclusion of the DoD Component explosives and CA safety personnel and the Chairman, DDESB, in deliberations, decision making, and approvals pertaining to future munitions response activities to address MEC or CAs, regardless of CA configuration.

V7.E4.8.2.9. Inclusion of the restrictions and conditions in the recorded land records for the jurisdiction, to the extent allowed by State law.

ENCLOSURE 5

SPECIAL STORAGE PROCEDURES FOR WASTE MILITARY MUNITIONS

V7.E5.1. SCOPE AND APPLICATION

V7.E5.1.1. The Environmental Protection Agency promulgated the Munitions Rule (MR), subpart M of part 266 of title 40, Code of Federal Regulations (CFR) (Reference (k)) to define when chemical and conventional military munitions become a solid or hazardous waste and to provide for the safe storage and transportation of such waste. The MR takes precedence over these standards. The MR sets forth two approaches for the storage of waste military munitions:

V7.E5.1.1.1. A conditional exemption (CE) from certain “Resource Conservation and Recovery Act (RCRA)” (see section 6901 of title 42, U.S.C. (Reference (l))) requirements.

V7.E5.1.1.2. A new RCRA storage unit standard (i.e., subpart EE of parts 264 and 265 of Reference (k)).

V7.E5.1.2. This enclosure establishes additional requirements for storage of waste military munitions in the United States.

V7.E5.2. WAIVERS AND EXEMPTIONS

V7.E5.2.1. CE Storage. Waivers and exemptions from this Manual are not authorized for AE storage facilities (hereafter designated as an ammunition storage unit (ASU)) storing CE waste military munitions.

V7.E5.2.2. RCRA Storage. Waivers and exemptions from this Manual shall only be available to the DoD Components storing waste munitions under RCRA unit standards (e.g., subpart EE, part 264 of Reference (k)). The approval authority for these waivers and exemptions is the Secretary of the Military Department, who may delegate the authority no lower than an assistant secretary.

V7.E5.3. REQUIREMENTS FOR STORAGE OF WASTE MILITARY MUNITIONS UNDER CE

V7.E5.3.1. 40 CFR 266.205(a) Compliance. The DoD Components shall ensure that waste military munitions stored under CE comply with subpart 266.205(a) of Reference (k). The MR-established CE does not apply to toxic CAs or toxic chemical munitions.

V7.E5.3.2. DoD Component Responsibilities. The DoD Components shall ensure that installations and responsible activities:



V7.E5.3.2.1. Maintain records of stored waste military munitions for a minimum of 3 years from the date they were last stored. The records must be distinguished by type. A separate record or line item is required for each type of munition in any mixed lot of munitions received for storage. The record shall include the following:

V7.E5.3.2.1.1. The type of waste military munitions stored by standard nomenclature, lot number, Federal supply class, national stock number, DoD identification code, and condition code.

V7.E5.3.2.1.2. The quantity stored.

V7.E5.3.2.1.3. The date identified as “waste.”

V7.E5.3.2.1.4. The date they left storage.

V7.E5.3.2.1.5. The storage location or locations (e.g., building number or storage pad, and grid coordinates) where they were stored.

V7.E5.3.2.1.6. The means (e.g., destroyed, demilitarized, and shipped) and date of disposition.

V7.E5.3.2.1.7. When applicable, the sending and receiving sites for those waste military munitions received from or shipped to offsite sources.

V7.E5.3.2.2. Physically separate (e.g., on a separate pallet or shelf) waste military munitions from non-waste military munitions when both are stored in the same ASU.

V7.E5.3.2.3. Clearly mark the physically separated waste military munitions to ensure proper identification.

V7.E5.3.2.4. Store waste military munitions under CE in ASUs that comply (without waiver or exemption) with the provisions of this Manual. Each ASU storing waste military munitions or explosives under CE must be included in a DDESB-approved explosives safety site plan that the installation keeps on file. Those portions of the site plan addressing ASUs storing waste military munitions under CE shall be made available to applicable Federal or State environmental regulatory authorities on request.

V7.E5.3.2.5. Have standard operating procedures or plans (see section V1.E10.6.) that provide safety, security, and environmental protection. Those plans shall be coordinated with the applicable Federal, State, and local emergency response authorities (e.g., law enforcement, fire departments, and hospitals) and any established Local Emergency Planning Committee.

### V7.E5.3.3. Loss of CE

V7.E5.3.3.1. The unpermitted or uncontrolled detonation, release, discharge, or migration (e.g., loss or theft, or as a result of fire or explosion) of waste military munitions out of

any ASU that might endanger human health or the environment shall result in the immediate loss of CE for those waste military munitions. Incidents of that nature and the loss of CE require reporting under section V7.E5.5.

V7.E5.3.3.2. The applicable Federal or State environmental regulatory authorities may withdraw CE based on review or inspection of the installation's or responsible activity's compliance with the requirements for storage of waste military munitions under CE. The DoD Components may, at any time, restrict an activity from using CE. Additionally, the DDESB or the DoD Component, upon discovery of a condition that could warrant loss of CE, shall report the condition to the applicable DoD Component and to the commander of the installation or responsible activity.

V7.E5.3.3.3. If CE is lost, the waste military munitions are subject to other RCRA hazardous waste regulations. The installation or responsible activity must obtain any required RCRA permits because of the loss of CE.

V7.E5.3.3.4. Installations and responsible activities may apply for reinstatement of CE under subpart 266.205(c) of Reference (k).

#### V7.E5.4. OTHER STORAGE STANDARDS

V7.E5.4.1. The DoD Components shall forward to the Chairman, DDESB, a copy of their implementing standards or regulations pertaining to the storage of waste military munitions.

V7.E5.4.2. Many States regulate waste management activities, including the storage of waste military munitions. Their authority is based on the waiver of sovereign immunity in federal environmental laws. Their laws, to the extent they fall within the waivers of sovereign immunity, take precedence over these standards. If such State regulations conflict with DDESB or the DoD Components' explosives safety standards, the affected Component shall attempt to resolve the conflict. For those issues that cannot be resolved, the DoD Component shall notify the Chairman, DDESB, through its Board Member if it has one, of any irreconcilable conflict of State law, regulation, or directive with these or other DoD or Military Component explosives safety standards.

V7.E5.5. UNPERMITTED AND UNCONTROLLED LOSS REPORTING. In addition to other applicable reporting requirements, installations and responsible activities shall notify their chain of command, the DDESB Chairman (through the DoD Component channels), the applicable Federal or State environmental regulatory authority, and established local committees, as follows:

V7.E5.5.1. Telephonically or, in the case of the DoD Component and the DDESB, electronically (by email message or facsimile and using the format specified in Volume 1, Enclosure 4) within 24 hours from the time the installation or responsible activity becomes aware of any unpermitted or uncontrolled detonation, release, discharge, or migration of waste military

munitions out of any ASU (e.g., loss or theft, or as a result of fire or explosion) that may endanger human health or the environment; and

V7.E5.5.2. In writing, if the initial report was telephonic, within 5 days from the time the installation or responsible activity becomes aware of any unpermitted or uncontrolled detonation, release, discharge, or migration of waste military munitions out of any ASU (e.g., loss or theft, or as a result of fire or explosion) that may endanger human health or the environment. Follow-up reports to the DoD Component and the DDESB are required only when pertinent information, which was not previously reported, becomes known. Such reports, to include a report of investigation, shall comply with the requirements of Volume 1, Enclosure 4.

#### V7.E5.6. CLOSURE OF FACILITIES STORING WASTE MILITARY MUNITIONS UNDER CE

V7.E5.6.1. In addition to the explosives safety requirements of Enclosure 11 of Volume 1 of this Manual:

V7.E5.6.1.1. When an ASU that stored waste military munitions under CE is permanently taken out of service for the storage of non-waste and waste military munitions, installations and responsible activities shall ensure that such ASUs are closed IAW applicable requirements.

V7.E5.6.1.2. Installations or responsible activities must notify the cognizant Federal or State environmental regulatory authorities in writing at least 45 days before the closure activities begin, or as provided by applicable law. Initiation of those closure procedures should occur within 180 days, or as provided by applicable law, after the date the decision is made to permanently stop using the ASU for the storage of military munitions.

V7.E5.6.1.3. On completion of closure activities, a "Certification of Closure," signed by the installation or responsible activity commander, or other equivalent level authority, and by an independent (i.e., an individual not assigned within the commander's or equivalent-level authority's chain of command) registered professional engineer must be submitted to the cognizant Federal or State environmental regulatory authorities within 90 days of completing the closure activities, or as provided by applicable law.

V7.E5.6.1.4. The Certificate of Closure must state, at a minimum, that each of the explosives safety requirements in Enclosure 11 of Volume 1 of this Manual have been met and that waste military munitions and residues are removed in such a manner as to protect the public and the environment consistent with the planned use of the ASU and the property.

V7.E5.6.1.5. If closure certification cannot be rendered, the installation or responsible activity must contact the cognizant Federal or State environmental regulatory authorities to determine the required course of action.

V7.E5.6.2. When an ASU that stored waste military munitions under CE is permanently taken out of service for the storage of waste military munitions, but is to continue in service for the storage of non-waste military munitions, installations and responsible activities shall ensure that waste military munitions and residues are removed.

V7.E5.7. CLOSURE OF FACILITIES STORING WASTE MILITARY MUNITIONS UNDER RCRA. In addition to those explosives safety requirements in Enclosure 11 of Volume 1 of this Manual, closure procedures for those sites operating under existing RCRA (subpart EE of parts 264 and 265 of Reference (k)) permits shall follow the closure requirements stipulated in the respective permit.

ENCLOSURE 6

MPPEH

V7.E6.1. SCOPE. This enclosure establishes explosives safety standards for MPPEH that supplement guidance provided in DoD Instruction 4140.62 (Reference (m)). These standards are intended to protect personnel and property from unintentional exposure to potential explosive hazards associated with material (including waste material) being managed or transferred within or released from DoD control.

V7.E6.2. FUNCTIONS

V7.E6.2.1. The Heads of the DoD Components shall establish criteria that may be risk-based to determine and document whether a receiver, either a DoD Component or non-DoD entity, is qualified to receive, manage, and process MPPEH through its release from DoD control. These criteria shall be coordinated with the DDESB and the Assistant Secretary of Defense for Logistics and Materiel Readiness.

V7.E6.2.2. The DDESB shall develop, through its coordination processes, specific ESM procedures and standards for determining the explosives safety status of material and for processing MPPEH through its release from DoD control. The requirements of Reference (m) and other DoD issuances will be synchronized with these ESM procedures and standards.

V7.E6.2.3. MPPEH, material documented as safe (MDAS), and material documented as an explosive hazard (MDEH) shall be managed in a manner that complies with explosives safety standards, materiel management policies, and environmental requirements. The effective management of MPPEH, MDAS, and MDEH will help prevent the unauthorized or unintentional transfer or release of an explosive hazard from DoD control; the transfer or release of material documented hazardous to an unqualified receiver; or a shipment that violates hazardous material transportation regulations.

V7.E6.3. COLLECTED MPPEH

V7.E6.3.1. Control

V7.E6.3.1.1. MPPEH shall be controlled and managed (e.g., sorted, segregated, stored, secured) to prevent its unauthorized use, transfer or release, and to protect personnel and property from uncontrolled exposures to potential explosive hazards.

V7.E6.3.1.2. Prior to its transfer within the Department of Defense or release from DoD control, personnel certified by the responsible authority (e.g., installation commander) as technically qualified to act as signatories in determining the material's explosives safety status

shall document, in writing, that the material's characterization as safe (i.e., MDAS) or explosively hazardous (i.e., MDEH) is proper IAW the requirements in Reference (1).

V7.E6.3.2. Siting

V7.E6.3.2.1. Locations used for collected MPPEH processing operations (e.g., consolidation, inspection, sorting, storage, transfer, release) (MPPEH processing points) shall be sited per Volumes 3, 4, and 5 of this Manual as:

V7.E6.3.2.1.1. An ES, at not less than intraline distance from surrounding PESs.

V7.E6.3.2.1.2. A PES, when the MPPEH has not been documented as having an explosives safety status of safe (i.e., MDAS) or when the material has been documented as an explosive hazard (i.e., MDEH).

V7.E6.3.2.2. DDESB approval of siting is not required for locations on operational ranges that are used temporarily during range clearance activities for intermediate management of collected MPPEH (MPPEH collection points) prior to transfer to a MPPEH processing point. Range managers shall ensure that MPPEH collection points are located so that their ESQD arcs, based on the hazard classification and NEWQD assigned (see subparagraph V7.E6.3.2.3.), remain within the operational range's impact area and associated safety buffer zone.

V7.E6.3.2.3. The hazard classification and NEWQD shall be based upon characteristics of the type material involved, its packaging arrangement (if packaged), and the estimated or, if known, calculated amount of explosives potentially present.

V7.E6.3.3. Marking and Securing

V7.E6.3.3.1. Containers and holding areas for material being processed shall be secured and clearly marked as to the explosive hazard, if any that may be present.

V7.E6.3.3.2. MPPEH processing shall be managed in a manner (see definition of "chain of custody" in Volume 8 of this Manual) that prevents:

V7.E6.3.3.2.1. MDEH from being commingled with MPPEH or MDAS.

V7.E6.3.3.2.2. MDEH from being misidentified as MPPEH or MDAS once the explosive hazards it presents have been determined.

V7.E6.3.3.2.3. MDAS from being commingled with MPPEH or MDEH.

V7.E6.3.3.2.4. MDAS from being misidentified as MPPEH or MDEH once it has been determined to be safe.

V7.E6.3.4. Transporting

V7.E6.3.4.1. MDAS may, from an explosives safety perspective, be transported or shipped over public transportation routes.

V7.E6.3.4.1.1. The explosives safety status documentation must accompany the shipment.

V7.E6.3.4.1.2. If the shipment contains hazardous materials or hazardous wastes other than explosives, transportation must comply with all applicable requirements of federal, state, interstate, and local laws.

V7.E6.3.4.1.2.1. Hazard classification assignments for the material being shipped may be required.

V7.E6.3.4.1.2.2. Any hazard classification assignments required must accompany the shipment.

V7.E6.3.4.2. MPPEH or MDEH shall not be transported or shipped over public transportation routes unless determined safe for transport by personnel who the commander or responsible authority certifies as technically qualified to make such a determination.

V7.E6.3.4.2.1. A determination that MPPEH or MDEH is safe for transport must be documented and signed by the individual making the determination. A copy of this certification must accompany the shipment.

V7.E6.3.4.2.2. Hazard classification assignments are required to accompany the shipment (see subparagraph V7.E6.3.2.3.).

## GLOSSARY

### ABBREVIATIONS AND ACRONYMS

AAR	after action report
AE	ammunition and explosives
ASU	ammunition storage unit
BIP	blow-in-place
CA	chemical agent
CE	conditional exemption
CFR	Code of Federal Regulations
CSS	chemical safety submission
CWM	chemical warfare material
DDESB	Department of Defense Explosives Safety Board
DERP	Defense Environmental Restoration Program
DMM	discarded military munitions
DOT	Department of Transportation
DUSD(I&E)	Deputy Under Secretary of Defense for Installations and Environment
EC	engineering control
EOD	explosive ordnance disposal
ES	exposed site
ESM	explosives safety management
ESQD	explosives safety quantity-distance
ESS	explosives safety submission
ft	foot or feet
FUDS	formerly used defense site
GA	dimethylaminoethoxy-cyanophosphine oxide (common name is tabun) (nerve agent)
GB	isopropyl methylphosphonofluoridate (common name is sarin) (nerve agent)
GD	pinacolyl methylphosphonofluoridate (common name is soman) (nerve agent)
GF	o-cyclohexyl methylphosphonofluoridate (common name is cyclosarin) (nerve agent)
HBESL	health-based environmental screening level
HD	hazard division
HFD	hazardous fragment distance
H/HD	2,2' dichlorodiethyl sulfide (common name is distilled mustard)



H/HT	60 percent HD and 40 percent 2,2' dichloroethylthiodiethyl ether (common name is mustard-T mixture)
HWCL	hazardous waste control limit
IAW	in accordance with
IBD	inhabited building distance
IHF	interim holding facility
IMD	intermagazine distance
kg	kilogram
kPa	kilopascal
L	dichloro (2-chlorovinyl) arsine (common name is lewisite) (blister agent)
lbs	pounds
LUC	land use control
m	meter
m <sup>3</sup>	cubic meter
MCE	maximum credible event
MDAS	material documented as safe
MDEH	material documented as an explosive hazard
MEC	munitions and explosives of concern
MFD	maximum fragment distance
mg	milligram
MGFD	munition with the greatest fragmentation distance
MPPEH	material potentially presenting an explosive hazard
MR	Munitions Rule
MRA	munitions response area
MRC	multiple round container
MRS	munitions response site
MSD	minimum separation distance
NDAI	no DoD action indicated
NEWQD	net explosive weight for quantity-distance
NOFA	no further action
OB	open burning
OD	open detonation
PAED	public access exclusion distance
PES	potential explosion site
psi	pounds per square inch
QA/QC	quality assurance and quality control
RCRA	Resource Conservation and Recovery Act

RCWM	recovered chemical warfare material
RSP	render safe procedure
STEL	short-term exposure limit
TCRA	time critical removal action
TNT	trinitrotoluene
TSD	team separation distance
U.S.C.	United States Code
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
UXO	unexploded ordnance
VX	0-ethyl S-[2-(diisopropylamino) ethyl] methylphosphonothioate (nerve agent)