EP 385-1-95b
28 Mar 2003

US Army Corps of Engineers®

SAFETY

EXPLOSIVES SAFETY SUBMISSION

ENGINEER PAMPHLET

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DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

EP 385-1-95b

CESO

Pamphlet
No. 385-1-95b

28 March 2003

Safety
EXPLOSIVES SAFETY SUBMISSION (ESS)

1. Purpose. This pamphlet provides U.S. Army Corps of Engineers (USACE) personnel with procedural guidance for preparing Explosives Safety Submissions (ESS) for conventional ordnance and explosives (OE) response actions.

2. Applicability. This pamphlet applies to all Headquarters, U.S. Army Corps of Engineers (HQUSACE) elements and all USACE commands having responsibility for performing OE response activities.

3. Distribution Statement. Approved for public release; distribution is unlimited.

4. References. Required and related references are at Appendix A.

5. Explanation of Abbreviations and Terms. Abbreviations/acronyms and special terms used in this pamphlet are explained in the glossary.

FOR THE COMMANDER:

4 Appendices
(See Table of Contents)

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CHAPTER 1
GENERAL

1-1. Introduction. This Engineer Pamphlet (EP) presents requirements and procedures for preparing Explosives Safety Submissions (ESS) for conventional ordnance and explosives (OE) response actions conducted by the United States Army Corps of Engineers (USACE). This EP also delineates roles and responsibilities of various entities in the preparation, review, and approval of an ESS.

1-2. ESS Overview.

a. Description of the ESS.

(1) The ESS provides the safety specifications for execution of the selected response alternative(s).

(2) An ESS must be done for all response actions, even if the recommended response action is either No Department of Defense (DOD) Action Indicated (NDAI) or Institutional/Engineering Controls. Typically the ESS will be done during the design phase. An ESS is not required for the purpose of investigation.

(3) The ESS must be approved prior to the implementation of the recommended response alternative.

(4) The ESS will be prepared based on the anticipated worst case scenario using the Munition with the greatest fragmentation distance (MGFD) (i.e., the largest unexploded ordnance (UXO) item with the largest net explosive weight and the greatest fragmentation distance, or even multiple rounds unintentionally firing together). The MGFD will be determined based upon the UXO items that are realistically expected to be located at the site.

b. Purpose of the ESS. The purpose of the ESS is to ensure that all applicable DOD and Department of the Army (DA) explosive safety standards are applied during an OE response action. The OE project team will ensure that the ESS, Work Plan (if applicable), Scope of Work, and Action Memorandum are consistent with each other.

c. Utilization of the ESS.

(1) Intrusive operations performed for the purpose of removing OE will be executed in accordance with the ESS. Intrusive or surface removal operations may not begin, during an OE removal action, until the ESS has being approved by the appropriate authority.

Approved ESS changes must be incorporated into the Work Plan, and vice versa, before intrusive or surface removal operations begin.

(2) All personnel working at, or visiting, a site during an OE removal action must comply with the ESS.

(3) A copy of the approved ESS will be maintained at the project site.

(4) In the event that a more hazardous situation is encountered in the field than is identified in the approved ESS, then an amended ESS will be prepared that covers the newly identified hazard. Work may continue on site until the amended ESS has been approved; however, the more restrictive measures (e.g., increase in the exclusion zone) will be implemented immediately. See Chapter 6 for additional details on preparing changes to an approved ESS.

1-3. Regulatory Authorities. A discussion of the laws and regulations governing OE response actions is provided in EP 1110-1-18, entitled "Ordnance and Explosives Response". This discussion provides an overview of the legal authorities for conducting an OE response action and includes the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), National Oil and Hazardous Substance Pollution Contingency Plan (NCP), Defense Environmental Restoration Program (DERP) [including the Formerly Used Defense Sites (FUDS) program and Installation Restoration Program (IRP)], Base Realignment and Closure (BRAC) program, Resource Conservation and Recovery Act (RCRA), and the Environmental Protection Agency (EPA) Military Munitions Rule.

CHAPTER 2
REQUIREMENTS FOR SUBMISSION OF AN ESS

2-1. Introduction. This chapter discusses the applicability of the ESS process (i.e., which projects require an ESS). As previously stated, the ESS process described in this EP applies to response actions addressing conventional OE. The following sections describe the applicability of the ESS process to projects at various types of properties. General guidance for Recovered Chemical Warfare Materiel (RCWM) CSS' are found in EP 75-1-3.

2-2. OE Response Action Projects Requiring an ESS. An ESS is required for OE response actions at the following types of properties.

a. FUDS. A FUDS OE response is an action taken to reduce the risk to human health and the environment from exposure to OE resulting from past DOD operations at a site.

b. BRAC sites. OE response actions at transferring installations are conducted under the BRAC program. {Defense Base Closure and Realignment Acts of 1988 (Public Law 100-526), and 1990 (Public Law 101-510)}

c. Transferring excess property other than BRAC.

d. IRP sites.

e. Projects located in off-post areas near active installations. For example, areas that contain munitions unintentionally fired off post.

2-3. OE Response Action Projects Not Requiring an ESS.

a. An ESS is not required for emergency OE removal actions [e.g., emergency response actions conducted by military Explosive Ordnance Disposal (EOD) units].

b. An ESS is not required for range clearance operations conducted on active and inactive ranges that reside on DOD property.

c. An ESS is not required for site characterization activities conducted on OE sites. Site characterization activities will be conducted in accordance with an approved Work Plan and Site-Specific Safety and Health Plan. EP 1110-1-18 and Engineer Manual (EM) 1110-1-4009, both titled “Ordnance and Explosives Response”, include details regarding the site characterization phase of an OE project.

d. An ESS is not required for standby construction activities, but may be required for any removal conducted in the construction footprint prior to construction activities starting.

CHAPTER 3
TYPES OF ESS's

3-1. Introduction.

a. This chapter discusses the four types of ESSs. The four types are listed below and are described in more detail in the following sections.

(1) An ESS prepared as part of a response action when the recommended response alternative in the decision document is the physical removal of conventional OE.

(2) An ESS prepared as part of a response action when the recommended response alternative in the decision document is Institutional/Engineering Controls.

(3) An ESS prepared as part of a response action when the recommended response alternative in the decision document is NDAI. Once a site has been listed on the DOD's munitions response inventory, it cannot proceed to a NDAI without an ESS, regardless of the response phase completed.

(4) An ESS prepared for a Time Critical Removal Action (TCRA).

b. Depending on the circumstances at a site, different identified OE areas may not be included in the same ESS. If this is the case, the ESS will identify the other areas and explain why they were not included (e.g., the other areas were covered in a previous ESS or will be covered in a future ESS). In the event that an ESS had been previously approved for a different OE area at a site, then the previously approved ESS will be referenced in the new ESS.

3-2. Removal Action ESS.

a. This type of ESS is prepared as part of the removal design phase of a response action when the recommended response alternative in the decision document involves the physical removal of conventional OE.

b. The ESS must be approved prior to the initiation of intrusive operations.

c. The format for a removal action ESS is described in the Department of Defense Explosive Safety Board's (DDESB's) "Memorandum Guidance for Clearance Plans", dated January 1998. This memorandum may also be found on the U.S. Army Technical Center for Explosive Safety's (USATCES') website at http://www.dac.army.mil/es/documents/esslist.pdf. Additional information on this type of ESS is provided in the OE Mandatory Center of Expertise's (MCX's) Data Item Description (DID) OE-060, "Conventional Explosives Safety Submission", which is located on the OE MCX website at http://www.hnd.usace.army.mil/oew/dids.asp.

d. The ESS will include a description of the Recurring Review Plan as presented in the EE/CA report.

e. The ESS will describe the type of engineering controls that will be used during the removal action, if applicable. An engineering control is any process or device designed to reduce the blast or fragmentation effects of an OE detonation. Engineering controls may be used to reduce the Minimum Separation Distances (safe separation distances) for removal actions.

(1) Engineering controls may be used as needed with prior approval from DDESB at any USACE project. The OE Design Center will review any application of an approved engineering control to assure proper utilization at the specific site. This site-specific application will be described in the ESS. The technical data package and DDESB approval must be maintained on site during the application of the engineering control.

(2) An engineering control may be submitted without prior approval by DDESB as part of the ESS for DDESB approval, but will only be approved for that specific site and the specific application(s) described in the ESS.

(3) "Prior approval" as used here means a separate (not site-specific) report describing the design, testing, and capabilities of an engineering control was developed, sent through explosives safety channels for review and concurrence, and was ultimately approved by DDESB for general application. Example engineering controls applications can be found on the OE MCX website at http://www.hnd.usace.army.mil/oew/tech/analytical tools/analindx.htm.

3-3. Institutional/Engineering Controls ESS.

a. This type of ESS is prepared upon finalization of the decision document that identifies Institutional/Engineering Controls as the recommended response alternative for an OE site.

b. The ESS is submitted for approval after the approval of the decision document.

c. The format for an Institutional/Engineering Controls ESS is provided in Appendix B. Because UXO is not being removed, several sections required for a removal action ESS are not applicable to the Institutional/Engineering Controls ESS.

3-4. NDAI ESS.

a. This type of ESS is prepared upon finalization of a decision document that identifies NDAI as the recommended response alternative for an OE site. The ESS is prepared after the public comment period has been held on the decision document and any comments received as a result of the public comment period have been addressed in the decision document.

b. The ESS is submitted for approval after the decision document has been approved.

c. The format for a NDAI ESS is provided in Appendix C. Because UXO is not being removed, several sections required for a removal action ESS are not applicable to the NDAI ESS.

3-5. TCRA ESS.

a. A TCRA may be required to respond to an imminent danger posed by OE hazards at a site, such that cleanup or stabilization actions must be initiated within six months to reduce the risk to public health or the environment. The increased urgency of a TCRA requires an ESS process, which is described below.

b. The format for a TCRA ESS is provided in Appendix D.

c. A TCRA will not proceed to a NDAI status without a Site Specific Final Report that addresses all items required in a NTCRA ESS and justifies the NDAI. Site Specific Final Reports will be reviewed and approved in accordance with the requirements for a NTCRA ESS.

CHAPTER 4
PREPARATION OF AN ESS

4-1. Introduction. This chapter discusses the preparation of an ESS, including a description of the roles and responsibilities of USACE organizations in the preparation of an ESS, contents of an ESS, and technical references useful in the preparation of an ESS.

a. DOD is the lead agency for all OE response actions. Responsibility for executing an OE response action, and hence approval authority for an ESS, depends on whether the site is a FUDS or an active or transferring installation. The ESS approval process is discussed in Chapter 5.

(1) OE response actions at sites that were contaminated while under the jurisdiction of DOD, but which subsequently have been transferred out of DOD control (i.e., FUDS) are conducted under the DERP-FUDS program. OE response actions at FUDS are described in EP 1110-1-18. Authority for executing OE response actions at FUDS has been delegated to USACE by DOD through HQDA.

(2) Active and Transferring Installations. USACE may or may not be involved in OE response actions at active and transferring installations.

(3) Engineer Regulation (ER) 1110-1-8153, “Ordnance and Explosives Response”, provides roles and responsibilities for USACE elements in managing and executing OE response actions and authorizes and provides for the delegation of such roles and responsibilities.

b. Throughout this document, district review and approval responsibilities for project activities are discussed. These responsibilities have been delegated by the Major Subordinate Command (MSC) to the assigned district for project sites within their geographic area.

c. Districts requiring additional information beyond that discussed in this document should contact the OE MCX.

4-2. Organizational Responsibilities.

a. MSC Commanders are assigned overall responsibility for the safe and efficient execution of OE response actions for all projects for which they are the Project Manager (PM) in accordance with ER 5-1-11.

b. The responsibilities of Headquarters, United States Army Corps of Engineers (HQUSACE) for planning and executing OE response actions are discussed in ER 1110-1-8153 and EP 1110-1-18.

c. USATCES is responsible for review and approval of ESSs at DA.

d. DDESB is responsible for review and approval of ESSs at DOD.

e. The responsibilities presented in this chapter are FUDS specific. For projects under the management of an active or transferring installation, the installation must retain some degree of management control. In such cases, the PM will hire the appropriate OE Design Center to provide USACE assistance in a manner that is transparent to the customer, but the PM will remain the interface with the installation.

f. It is the responsibility of all USACE personnel involved with the OE Program to safely execute OE response projects in accordance with applicable laws, regulations, and policies. All USACE organizations will ensure that all personnel involved with on-site activities at project sites are familiar with and have access to copies of the approved ESS prepared for the site-specific activities to be conducted.

g. All USACE elements will ensure that OE response actions include provisions for meaningful stakeholder involvement pursuant to all applicable laws, regulations, and policies.

4-3. Parties Responsible for Preparation of the ESS.

a. The ESS will be developed with the full involvement of the OE project team.

b. Responsibilities for preparation and approval of an ESS are discussed in chapter 5.

c. The OE project team, under the direction of the district PM, will be fully involved in the preparation of the ESS. The OE project team members include the district PM; other representatives from the district, as required; the OE Design Center; the OE MCX, as required; the Hazardous, Toxic, and Radioactive Waste (HTRW) MCX and/or HTRW Design Center, as required; federal land managers; the prime contractor PM; state and federal regulators; the Native American Tribal Government point of contact, if applicable; and other key technical and non-technical individuals, as appropriate.

4-4. Contents of the ESS. As described in Chapter 3, the four types of ESSs will contain varying types of information depending on the type of response action discussed in the ESS. Preliminary studies, OE sampling reports, and the Work Plan for the response action provide much of the required information.

a. The format for a NTCRA ESS is described in the DDESB Memorandum, "Guidance for Clearance Plans", dated January 1998. This memorandum may be found on the USATCES website at http://www.dac.army.mil/es/documents/esslist.pdf. Additional information on this type of ESS is provided in the OE MCX DID OE-060, "Conventional Explosives Safety Submission", which is located on the OE MCX website at http://www.hnd.usace.army.mil/oew/dids.asp.

b. Appendices B and C, respectively, contain example formats for the NTCRA ESS for Institutional/Engineering Controls and NTCRA ESS for a NDAI recommendation.

c. Appendix D contains an example format for a TCRA ESS.

4-5. Technical References. Table 4.1 presents a summary of technical references that may be applicable to the preparation of an ESS. These documents can be found on the OE MCX website at http://www.hnd.usace.army.mil/oew or the HQUSACE website at http://www.usace.army.mil.

Table 4.1
Technical References for Use in the Preparation of an ESS

Directive/Regulation	Title Reference	Contents
DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards, July 1999	Facilities Construction and Siting	Chapter 5 indicates that construction features and location are important safety considerations in planning facilities that are to be a potential explosive source (PES) or exposed to the damaging effects of potential explosions. The effects of potential explosions may be altered significantly by construction features that limit the amount of explosives involved, attenuate resultant blast overpressure or thermal radiation, and reduce the quantity and range of hazardous fragments and debris. Proper location of exposed sites in relations to PESs ensures against unacceptable damage and injuries in the event of an incident. This chapter contains siting and construction standards to be used within the DOD.
DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards, July 1999	Lightning Protection	Chapter 7 defines minimum explosive safety criteria for the design, maintenance, testing and inspection of lightning protection systems. Properly maintained lightning protection is required (with exceptions) for ammunition and explosives facilities. If other lightning protection systems for these facilities are used, they shall offer equivalent protection of the types prescribed in Chapter 7.
DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards, July 1999	Hazard Identification for Fire Fighting and Emergency Planning	Chapter 8 establishes standard fire fighting hazard identification measures to ensure a minimum practicable risk in fighting fires of ammunition and explosives. These identification measures are based on the classification of fires into four fire divisions according to the hazard they present. Chapter 8 establishes minimum guidelines for the development of emergency plans, including safety, security, and environmental protection, which have been coordinated with local authorities.

Table 4.1 (continued)
Technical References for Use in the Preparation of an ESS

Directive/Regulation	Title Reference	Contents
DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards, July 1999	Quantity-Distance (Q-D)	Chapter 9 indicates the damage or injury potential of explosions is normally determined by the prevailing distance between the PES and the exposed site (ES); the ability of the PES to suppress blast overpressure, primary and secondary fragments, and debris; and the ability of the ES to resist explosion effects. Chapter 9 sets minimum standards for separating a PES from an ES that takes into account anticipated explosion effects suppression and resistance. Q-D relationships are established for related and unrelated PES's and explosives and non-explosives ES's.
DDESB-KO Memorandum, 27 Oct 98	Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites, (Terminology Updated March 2000)	Indicates the Minimum Separation Distance (MSD) for all personnel will be the greater of the overpressure distance based on total net explosive weight (NEW) or the appropriate fragment range as determined by the maximum fragment range or the mitigated fragment range.
HNC-ED-CS-S-98-1	Methods for Predicting Primary Fragmentation Characteristics of Cased Explosives, January 1998	This document details the methods used to determine fragmentation characteristics of cased explosives. An example and uses of fragmentation characteristics are discussed. Blast overpressure, thermal effects, ground shock and noise from an accidental explosion are not addressed in this document.
HNC-ED-CS-S-98-2	Method for Calculating Range to No More Than One Hazardous Fragment per 600 Square Feet, January 1998	This document details the theory and method used to determine the range to no-more-than one hazardous fragment per 600 square feet. Software has been developed using the theory described in HNC-ED-CS-S-98-2. The use of this software is described and an example detailed in this document.

Table 4.1 (continued)
Technical References for Use in the Preparation of an ESS

Directive/Regulation	Title Reference	Contents
EM 1110-1-4009	Blast and Fragment Protection in Ordnance and Explosives Response, 23 June 2000	Chapter 11 of this document describes the blast and fragment protection requirements for unintentional and intentional detonation to include a planning checklist and MSD requirements.
ENGINEERING CONTROLS		
HNC-ED-CS-S-96-8	Guide for Selection and Siting of Barricades for Selected Unexploded Ordnance, Revision 1, September 1997	This document provides information on selection and siting of barricades to defeat primary fragments from selected ordnance items. This document does not address effects from blast overpressure and noise.
HNC-ED-CS-S-97-7	Buried Explosion Module (BEM): A Method for Determining the Effects of Detonation of a Buried Munition, Revision 1, January 1998	The BEM is a software program designed to calculate the residual velocity of fragments produced by a buried munition and the maximum ejecta radius of large soil fragments produced by the buried explosion. The document discusses the theory used in BEM and the input required. Example problems are also provided in the document.
HNC-ED-CS-S-98-7	Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, August 1998	This document provides a summary of the test results and guidelines developed for the use of sandbag enclosures for fragments and blast mitigation due to intentional detonations at OE sites. The guidelines include required sandbag thicknesses, configuration and construction of the sandbag enclosures, and exclusion zone based on sandbag throw distances.

Table 4.1 (continued)
Technical References for Use in the Preparation of an ESS

Directive/Regulation	Title Reference	Contents
ENGINEERING CONTROLS (continued)		
HNC-ED-CS-S-98-8	Miniature Open Front Barricade, November 1998	Provides guidance information on miniature open front barricades (MOFB) designed to defeat the primary fragments due to an accidental/unintentional detonation of selected ordnance during intrusive operation. The document indicates that the MOFB is not designed to mitigate the effects from blast overpressure and noise and are not intended for reuse after an incident. Guidelines include barricade design, required aluminum and sandbag thicknesses, and the required exclusion zone.
HNC-ED-CS-S-99-1	Open Front and Enclosed Barricades, March 1999 (Terminology Updated March 2000)	Provides guidance information on open front barricades (OFB) and enclosed barricades (EB) designed to defeat the primary fragments due to an accidental/unintentional detonation of selected ordnance during intrusive operations. The document indicates that OFBs and EBs are not designed to mitigate the effects from blast overpressure and noise and are not intended for reuse after an incident. Guidelines include barricade design, required aluminum and sandbag thicknesses, and the required exclusion zone.
HNC-ED-CS-S-00-3	Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions	This document provides a summary of the test results and guidelines developed for the use of water for fragments and blast mitigation due to intentional detonations at OE sites.

CHAPTER 5
ESS APPROVAL PROCESS

5-1. Introduction. This chapter presents the ESS review and approval process for projects involving USACE initiatives. A period of 60 to 90 days should be provided for the review and approval of an ESS. The ESS will be routed and approved in accordance with DOD 6055.9-STD as implemented by DA and HQUSACE. HQUSACE delegated Major Command (MACOM) review and approval of ESSs to the Commander, U. S. Army Engineering and Support Center, Huntsville (USAESCH). HQUSACE and CESO retained the authority to review and approve ESSs for certain high risk or high visibility projects and to provide dispute resolution with respect to issues that cannot be resolved between USAESCH and the concerned party.

5-2. FUDS Projects Executed by the USACE Removal District.

a. The following process will be used in the preparation and review of an ESS for FUDS projects executed by the USACE removal district:

(1) The USACE Removal District will prepare the ESS and forward 4 copies to the OE Design Center.

(2) The OE Design Center forwards three copies of the ESS to the OE MCX for review and MACOM approval.

(3) The OE MCX reviews and provides MACOM approval and forwards two copies to USATCES for review and Army approval.

(4) USATCES will forward one copy to DDESB for final approval.

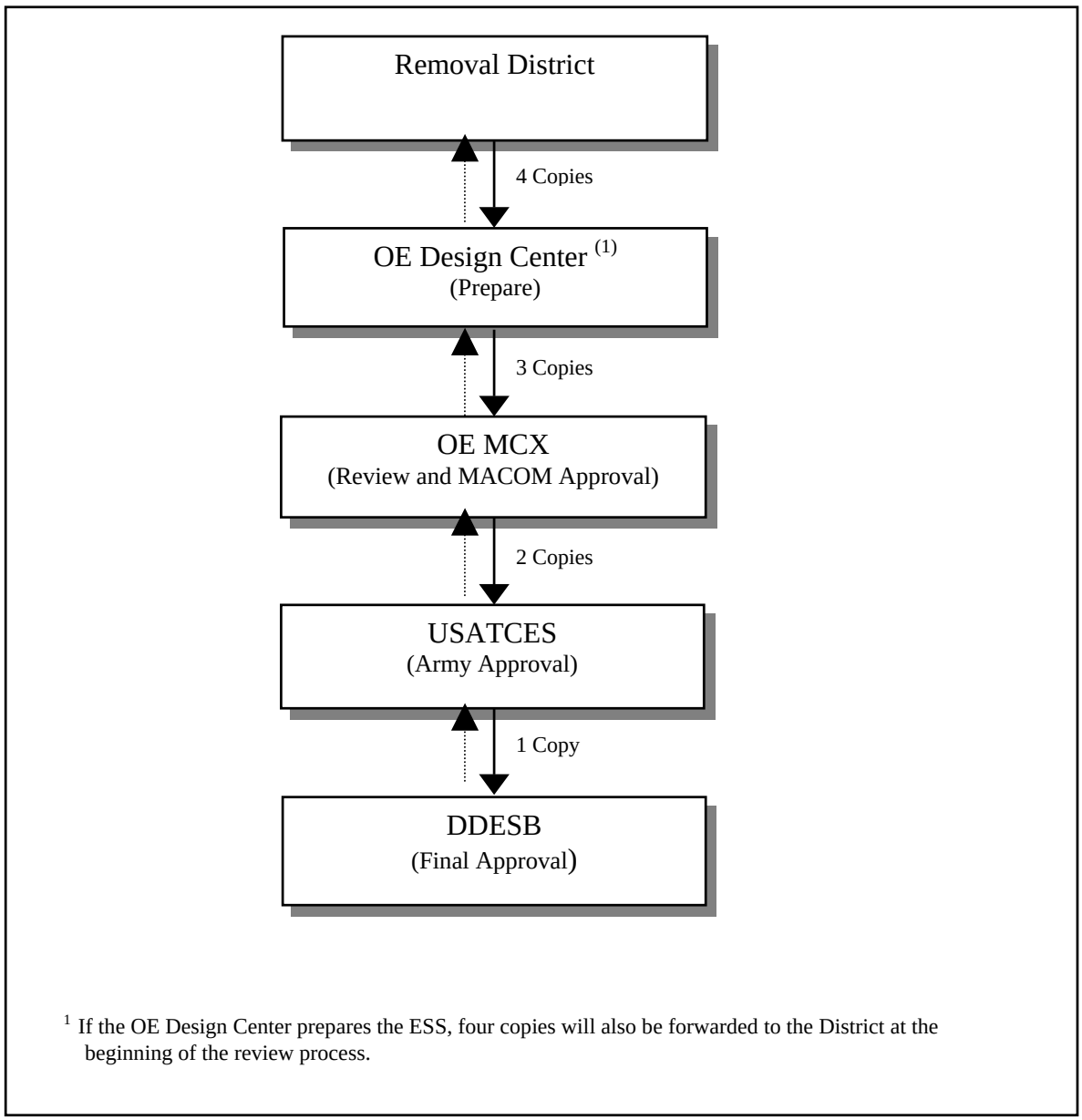
b. Figure 5-1 illustrates the ESS review and approval process for FUDS projects executed by the USACE removal district.

5-3. FUDS Projects Executed by an OE Design Center.

a. The following process will be used in the preparation and review of an ESS for FUDS projects executed by the OE Design Center:

(1) The OE Design Center is responsible for preparing the ESS.

(2) The OE Design Center forwards four copies to the USACE removal district and three copies to the OE MCX for review and MACOM approval.



[1] If the OE Design Center prepares the ESS, four copies will also be forwarded to the District at the beginning of the review process.

Figure 5-1. ESS Review and Approval Process for FUDS Projects

(3) The OE MCX reviews and provides MACOM approval and forwards two copies to USATCES for review and Army approval.

(4) USATCES will forward one copy to DDESB for final approval.

b. Figure 5-1 illustrates the ESS review and approval process for FUDS projects executed by the OE Design Center.

5-4. Installation Projects. The ESS may be prepared by the installation (active, BRAC, Excess and/or off-post (other than FUDS)) or the installation may request that the district or the OE Design Center prepare the ESS.

a. ESS prepared by the District or OE Design Center for an Installation Project.

(1) If the ESS is prepared by the USACE removal district or the OE Design Center, the following review and approval process will be followed:

(a) The OE MCX will conduct concurrent reviews of ESS prior to submittal to the installation.

(b) The installation will then gain approval in accordance with current service requirements.

(2) Figure 5-2 illustrates this ESS review and approval process.

b. ESS Prepared by the Installation for Installation Project to be executed by USACE. If the ESS is prepared by the installation, the following review and approval process will be followed:

(1) The installation provides two copies to the USACE removal district.

(2) The USACE removal district provides a copy to the OE MCX. Concurrently, the removal district coordinates comments with the OE MCX.

(3) The removal district forwards coordinated comments to the installation.

(4) The removal district needs to be in close coordination with the installation to ensure knowledge of any changes to the plan (changes to the plan will be coordinated with the OE MCX).

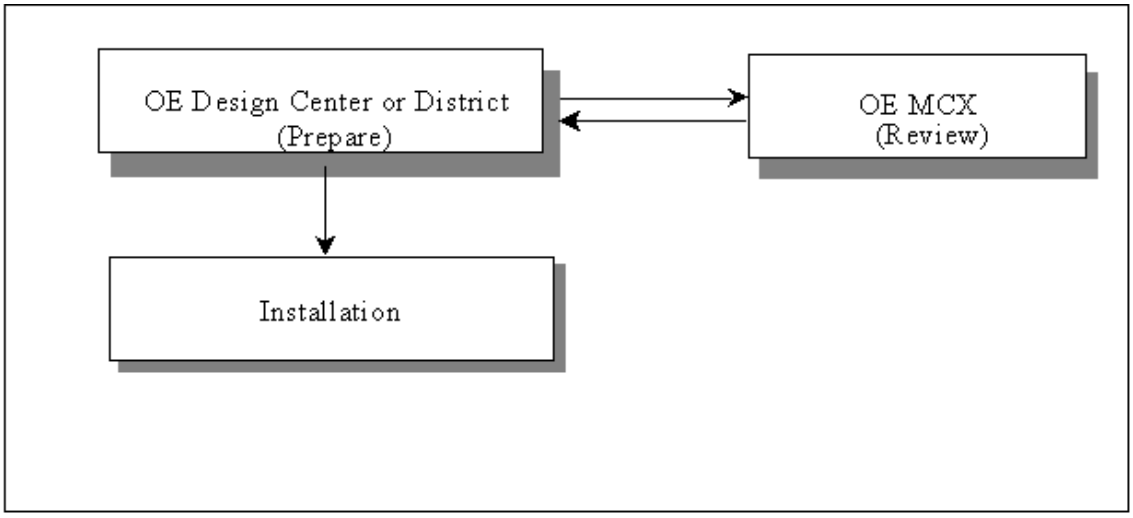


Figure 5-2. ESS Review and Approval Process for Installation Projects – ESS Prepared by OE Design Center or District

5-5. TCRA ESS.

a. The following process will be used in the preparation, review, and approval of a TCRA ESS:

(1) FUDS: The USACE removal district is responsible for preparation of the ESS. If the TCRA will be performed by the OE Design Center, the ESS will be prepared by the OE Design Center.

(2) Other: The ESS will be submitted to the OE MCX for review and MACOM approval.

(3) The OE MCX will forward the ESS to USATCES for review and Army approval.

(4) USATCES will forward to DDESB for final approval.

b. Figure 5-3 illustrates this review and approval process.

c. A TCRA will not proceed to a NDAI status without an After Action Report that addresses all items required in a NTCRA ESS and justifies the NDAI. After Action Reports will be reviewed and approved in accordance with the requirements for a NTCRA ESS

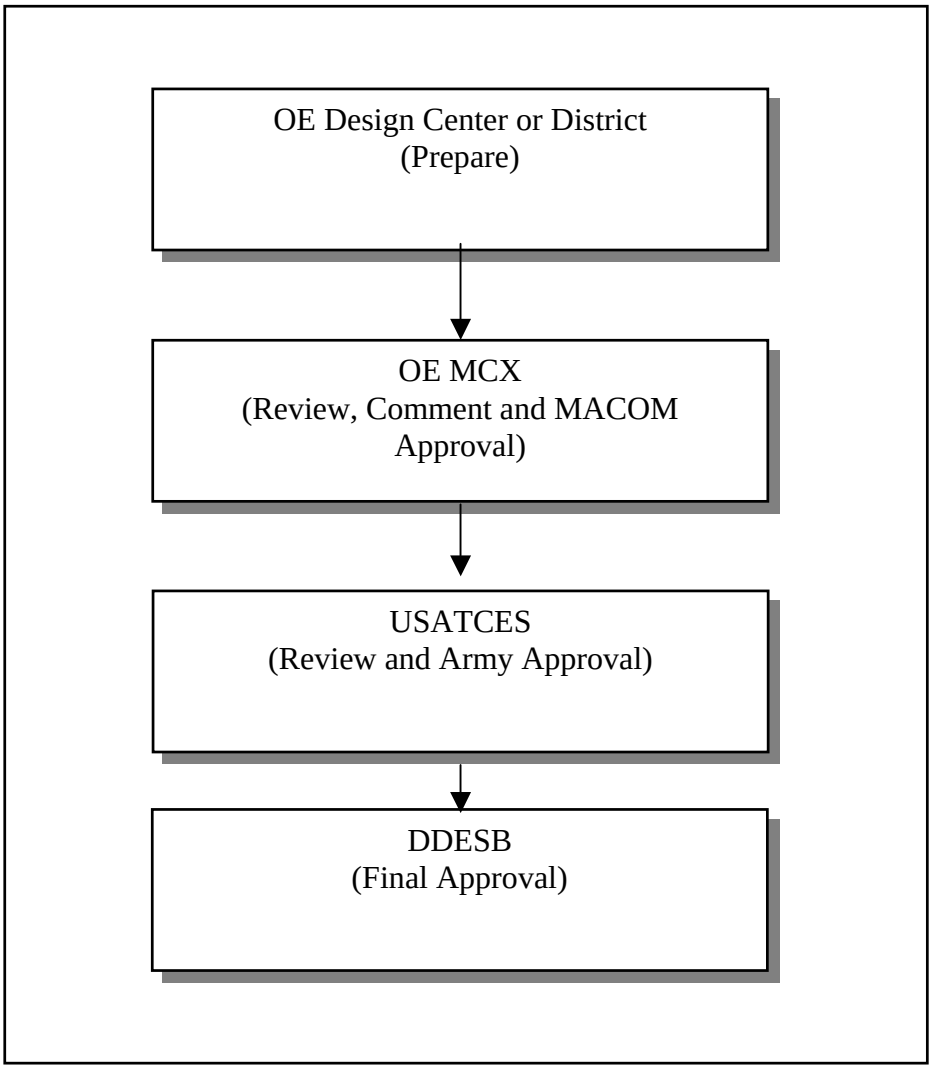


Figure 5-3. ESS Review and Approval Process for TCRA

5-6. Addresses for Routing and Approval.

(1) DDESB: Chairman, Department of Defense Explosives Safety Board (DDESB-KO), 2461 Eisenhower Avenue, Alexandria, VA 22331-0600.

(2) DA Safety: Chief of Staff (DACS-SF), 200 Army Pentagon, Washington, DC 20310-0200.

(3) CESO: USACE Headquarters, ATTN: CESO, 441 G Street, NW, Washington, DC 20314-1000.

(4) OE MCX: Commander, U.S. Army Engineering and Support Center (Huntsville), ATTN: CEHNC-OE-CX, P.O. Box 1600, Huntsville, AL 35807-4301.

(5) USATCES: Director, Defense Ammunition Center, ATTN: SOSAC-ESL, Building 35, 1 C Tree Road, McAlester, OK, 74501-9053.

CHAPTER 6
CHANGES TO AN ESS

6-1. Introduction. This chapter discusses requirements for modifying an approved ESS.

During the course of an OE response action, the hazards, risks, or explosives safety controls may change based on the actual conditions encountered. Depending on the type of change, either an amendment or a correction to the ESS is required.

6-2. Amendment to an ESS.

a. An amendment is required for changes regarding the assumed or known explosives hazards or any proposed changes in work activities or safety controls that can potentially affect worker or public safety.

b. An amendment requires approval through the same process followed for the original ESS (see Chapter 5).

(1) For a change that specifies less restrictive requirements (e.g., reduction in exclusion zone), the requirements of the approved ESS will not be implemented until the amendment is approved.

(2) When changes would be more restrictive than the requirements specified in the approved ESS (e.g., increase in the exclusion zone), the more restrictive measures will be implemented until the ESS amendment is approved.

(3) In some instances work will cease at a site until the ESS amendment has been approved. These situations will be on a case-by-case basis. Contact the OE MCX for specific guidance on when work will need to stop pending approval of the ESS amendment.

c. Example changes that require an amendment to the ESS.

(1) A change in the planned reuse of the property changes the clearance depth.

(2) A change in the clearance depth changes the planned reuse. For example, the ESS states that OE will be removed to a depth of four feet. However, circumstances are such that a clearance can only be performed to a depth of one foot. As a result, the reuse of the land must be further restricted.

(3) A change in the land use restrictions. For example, the ESS states that the property will be cleared to a depth of four feet and the land use will be restricted to surface

recreation, surface storage, and vehicle parking after the removal action. During the removal action, all of the OE is found at shallow depths and there is no reason to believe OE exists deeper than four feet. Therefore, it may be appropriate to change the land use restrictions. An amendment to the ESS must be prepared, providing the results of the removal action and explaining why it is highly unlikely that OE would be found deeper.

(4) The estimated OE depth changes, causing a change in the clearance depth (e.g., OE is consistently found at less than the estimated depths and a reduced clearance depth is desired).

(5) The clearance depth changes from below the frost line to above the frost line. The amendment should give: the frost line depth, state what the old clearance depth was, what the new clearance depth is, an explanation for the change, and what the follow-on monitoring procedures will be for upward migration due to frost heave.

(6) Property owners or stakeholders cause a decrease in the area to be cleared at a FUDS (e.g., right of entry denied).

(7) Incorporation of new or modified engineering controls not included in the approved ESS.

(8) Change in Q-D arcs.

(9) A new magazine storage area or demolition ground is established.

6-3. Correction to an ESS.

a. Corrections are changes that do not have the potential to affect worker or public safety. Corrections are typically administrative changes.

b. Corrections do not require approval through the process described in Chapter 5. Once the OE MCX concurs with a correction for a FUDS project, routing to higher-level offices is for information only.

c. The project team should use their best judgement in deciding whether such a change is significant enough to make a correction to the ESS. For example, a correction should be submitted if the area to be cleared is substantially increased (e.g., increase from 200 acres to 300 acres) with no other changes, however a correction would not be necessary if the change is minimal (e.g., increase from 200 acres to 203 acres).

d. When in doubt about whether an amendment or correction is required, call the OE MCX.

APPENDIX A
REFERENCES

A-1. Section I
Required Publications

Base Realignment and Closure Act of 1988, Public Law (PL) 100-526, 102 Stat. 2632

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, PL 96-510, 94 Stat 2767, 42 USC 9601

Defense Base Realignment and Closure Act of 1990, PL 101-510, 104 Stat. 1808

Defense Environmental Restoration Program, PL 99-499, Section 211, 100 Stat 1719, 10 USC 2701 et seq.

Resource Conservation and Recovery Act (RCRA) of 1976, PL 94-580, 90 Stat 2796, 42 USC 6901, et seq., as amended

Superfund Amendment and Reauthorization Act (SARA) of 1986, PL 99-499, 100 Stat 1613, amending CERCLA, 42 USC 9601 et seq., and miscellaneous other sections

29 CFR 1910.120
OSHA Hazardous Waste Operations and Emergency Response

40 CFR Part 260, et al
U.S. Environmental Protection Agency (EPA) Military Munitions Rule

40 CFR Part 300
EPA National Oil and Hazardous Substance Pollution Contingency Plan

49 CFR Part 172
Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information and Training Requirements

Federal Acquisition Regulation as of January 1, 1999

Defense Federal Acquisition Regulation Supplement

Army Federal Acquisition Regulation Supplement

EP 385-1-95b
28 Mar 03

Engineer Federal Acquisition Regulation Supplement

DOD 6055.9-STD
Ammunition and Explosives Safety Standards

AR 200-1
Environmental Protection and Enhancement

AR 385-10
The Army Safety Program

AR 385-64
Ammunition and Explosives Safety Standards

AR 405-90
Disposal of Real Estate

ER 5-1-11
Program and Project Management

ER 385-1-92
Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities

ER 1110-1-12
Quality Management

ER 1110-1-8153
Ordnance and Explosives Response

ER 1110-1-8158
Corps-Wide Centers of Expertise Program

EP 200-1-2
Process and Procedures for RCRA Manifesting

EP 1110-1-18
Ordnance and Explosives Response

EP 1110-3-8
Public Participation in the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS)

EM 1110-1-4009
Ordnance and Explosives Response

EM 385-1-1
Safety and Health Requirements Manual

DOD Explosives Safety Board Memorandum
Guidance for Clearance Plans, 27 January 1998.

NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Activities"

A-2. Section II
Related Publications

A related publication is merely a source of additional information. The user does not have to read it to understand this pamphlet.

AR 385-40
Accident Reporting and Records

DA Pam 385-64
Ammunition and Explosives Safety Standards

TM 5-855-1
Fundamentals of Design for Conventional Weapons

EP 385-1-95a
Basic Safety Concepts and Considerations for Ordnance and Explosives Operations

HNC-ED-CS-S-96-8
Guidance for Selection and Siting of Barricades for Selected Unexploded Ordnance

HNC-ED-CS-S-97-7
Buried Explosion Module (BEM): A Method for Determining the Effects of Detonation of a Buried Munition

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

HNC-ED-CS-S-98-2
Method for Calculating Range to No More than One Hazardous Fragment per 600 Square Feet

HNC-ED-CS-S-98-7
Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions

HNC-ED-CS-S-98-8
Miniature Open Front Barricade

HNC-ED-CS-S-99-1
Open Front and Enclosed Barricades

HNC-ED-CS-S-00-3
Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions

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

APPENDIX B
EXPLOSIVES SAFETY SUBMISSION FOR INSTITUTIONAL/ENGINEERING CONTROLS (EXAMPLE FORMAT)

B-1. Reason for Ordnance and Explosives.

Provide a brief description of why Ordnance and Explosives (OE) contamination exists in the specific area(s) of the site covered in the Explosives Safety Submission (ESS). This information may be derived from the following project documents: Inventory Project Report; Preliminary Assessment of Eligibility; Historical Records Searches; Archives Search Report; and/or Engineering Evaluation/Cost Analysis (EE/CA).

Provide a brief explanation that the site is under the Formerly Used Defense Site (FUDS) or Base Realignment and Closure (BRAC) program.

Provide a brief explanation that following an EE/CA or a risk assessment, the response action alternative of "Institutional/Engineering Controls" has been recommended. Include a description of the recommended institutional controls.

B-2. Maps.

a. Regional Map.

Provide a map showing the regional location of the site. For example, provide a state map with the site identified on it.

b. Site Map.

Provide a site map, which illustrates the OE area(s) addressed in the ESS. Show the current use of each area (for FUDS) or the expected reuse of each area (for BRAC). The specific boundaries of the area(s) should be clearly noted. If other areas of the site are not covered by the ESS, the reasoning for their exclusion should be explained. For example, these areas may be covered in a future ESS or were addressed by a previous ESS. If an area was covered in a previously approved ESS, then a copy of this ESS must be referenced in the new ESS and a copy of the approved ESS attached as an addendum to the new ESS.

Show the location of any areas, which will be addressed by institutional or engineering controls. For example, if deed restrictions are to be imposed, show the area affected. As another example, if an area will be fenced off, show the fence line.

c. Soil Sampling Map.

If sampling of soils or groundwater occurred during the site investigation, provide a map outlining the area(s) sampled and the location and depth of the sampling points. Identify the field screening methods used and the concentrations of munitions constituents for each sampling point. Identify any environmental or legal considerations that are important to the implementation of institutional/engineering controls.

B-3. Justification.

Provide justification for institutional or engineering controls at the area(s) addressed in the ESS. This justification should include the following:

a. The amounts and types of OE found during the site investigation. Present a brief synopsis of the results of the surface and intrusive investigations. This discussion should be supported by a table showing: the amount of OE; type of OE; and the depths of OE found in each area investigated.

b. A summary of the risk analysis performed on the area(s) addressed in the ESS.

c. A summary of the cost- benefit analysis, if performed.

d. Provide a summary for the rationale for the selection of institutional or engineering controls as the most appropriate action, based on the amount, type, and depth of OE found; the risk analysis; and (if available) the cost-benefit analysis.

e. If a Land Use Control Plan is available, provide it as an attachment to the ESS. If not available, describe each institutional or engineering control in detail. List the mechanism or agency where each control will reside (e.g., deed, local zoning board, building permit agency, local ordinance, etc). List who will monitor the effectiveness of the controls. List who will enforce the controls. List who will maintain any engineering controls (e.g., fences, signs). List any legal penalties, as applicable, for violation of any control. If public education is one of the selected controls, list who will be educated and how often and by what means. If fences and/or signs will be used, describe the type of fencing and the signage (content, spacing, size). If deed restrictions are used, include the restrictive language in substantially the same form, as it will appear in the deed, if possible.

B-4. Start Date.

Not applicable.

B-5. Migration of OE.

If the existing amounts, types, and depths of OE are expected to increase due to migration, describe what impact this will have on the level of risk at the site in the future. If the level of risk is expected to escalate back to an unacceptable level, describe what the plans are to address this escalation. Principle migration mechanisms are discussed below:

a. Frostline. State the depth of the frostline at the site. Where OE is above the frostline but is currently deep enough to be an acceptable risk with the chosen controls, but may migrate upward and cause trouble in the future, describe what provisions will be made for continued surveillance of the area.

b. If the area(s) encompass water bodies, then provide a discussion on the impact of wave action, tides, currents, storms, etc, on any potential OE migration.

c. If the area lies in a watershed such that runoff and erosion can carry OE from upstream into the area, address this concern.

B-6. Clearance Techniques.

Not applicable.

B-7. Alternate Techniques.

Not applicable.

B-8. Quantity-Distance.

Not applicable.

B-9. Off-site Disposal.

Not applicable.

B-10. Technical Support.

Not applicable.

B-11. Public Involvement.

Discuss the public participation activities, which occurred as part of the EE/CA process, including:

- Public meeting(s);
- Restoration Advisory Board, if applicable;
- 30-day public comment period;
- Press conference(s);

- Media day(s); and
- Location of the Administrative Record.

B-12. After Action Report.

An After Action Report will not be produced. A FUDS Completion Memorandum or Statement of Clearance will be executed to close out the project.

B-13. Recurring Reviews.

Include a description of the Recurring Review Plan.

B-14. Summary.

Present a summation of the project, which mirrors the language in the conclusion of the EE/CA.

Shall state that "A FUDS Completion Memorandum or Statement of Clearance will be placed in the Information Repository and may be placed in the Administrative Record."

APPENDIX C
EXPLOSIVES SAFETY SUBMISSION FOR NO DOD ACTION INDICATED (EXAMPLE FORMAT)

C-1. Reason for Ordnance and Explosives

Provide a brief description of why Ordnance and Explosives (OE) contamination exists in the specific area(s) of the site covered in the Explosives Safety Submission (ESS). This information may be derived from the following project documents: Inventory Project Report; Preliminary Assessment of Eligibility; Historical Records Searches; Archives Search Report; and/or Engineering Evaluation/Cost Analysis (EE/CA).

Provide a brief explanation that the site is under the Formerly Used Defense Site (FUDS) or Base Realignment and Closure (BRAC) program.

Provide a brief explanation that following an EE/CA or a risk assessment, the response action alternative of "No DOD Action Indicated" has been recommended.

C-2. Maps.

a. Regional Map.

Provide a map showing the regional location of the site. For example, provide a state map with the site identified on it.

b. Site Map.

Provide a site map, which illustrates the OE area(s) addressed in the ESS. Show the current use of each area (for FUDS) or the expected reuse of each area (for BRAC). The specific boundaries of the area(s) should be clearly noted. If other areas of the site are not covered by the ESS, the reasoning for their exclusion should be explained. For example, these areas may be covered in a future ESS or were addressed by a previous ESS. If an area was covered in a previously approved ESS, then a copy of this ESS must be referenced in the new ESS and a copy of the approved ESS attached as an addendum to the new ESS.

c. Soil Sampling Map.

If sampling of soils or groundwater occurred during the site investigation, provide a map outlining the area(s) sampled and the location and depth of the sampling points. Identify the field screening methods used and the concentrations of munitions constituents for each sampling point.

C-3. Justification.

Provide justification for No DOD Action Indicated at the area(s) addressed in the ESS. This justification should include the following:

a. The amounts and types of OE found during the site investigation. Present a brief synopsis of the results of the surface and intrusive investigations. This discussion should be supported by a table showing: the amount of OE, type of OE, and the depths of OE found in each area investigated.

b. A summary of the risk analysis performed on the area(s) addressed in the ESS.

c. A summary of the cost-benefit analysis, if performed.

C-4. Start Date.

Not applicable.

C-5. Migration of OE.

If the existing amounts, types, and depths of OE are expected to increase due to migration, describe what impact this will have on the level of risk at the site in the future. If the level of risk is expected to increase to an unacceptable level, describe what the plans are to address this escalation. Principal migration mechanisms are discussed below:

a. Frostline. State the depth of the frostline at the site. Where OE is above the frostline but is currently deep enough to be an acceptable risk, but may migrate upward and cause trouble in the future, describe what provisions will be made for continued surveillance of the area.

b. If the area(s) encompass water bodies, then provide a discussion on the impact of wave action, tides, currents, storms, etc, on any potential OE migration.

c. If the area lies in a watershed such that runoff and erosion can carry OE from upstream into the area, address this concern.

C-6. Clearance Techniques.

Not applicable.

C-7. Alternate Techniques.

Not applicable.

C-8. Quantity-Distance.

Not applicable.

C-9. Off-site Disposal.

Not applicable.

C-10. Technical Support.

Not applicable.

C-11. Public Involvement.

Discuss the public participation activities which occurred as part of the EE/CA process, including:

- Public meeting(s);
- Restoration Advisory Board, if applicable;
- 30-day public comment period;
- Press conference(s);
- Media day(s); and
- Location of the Administrative Record.

C-12. After Action Report.

An After Action Report will not be produced. A FUDS Completion Memorandum or Statement of Clearance will be executed to close out the project.

C-13. Recurring Reviews.

Include a description of the Recurring Review Plan.

C-14. Summary.

Present a summation of the project that mirrors the language in the conclusion of the EE/CA.

State that “A FUDS Completion Memorandum or Statement of Clearance will be placed in the Information Repository and may be placed in the Administrative Record.”

APPENDIX D
EXPLOSIVES SAFETY SUBMISSION FOR A TIME-CRITICAL REMOVAL ACTION (EXAMPLE FORMAT)

1. SITE:

   a. Name: FUDS #:

   b. Location: State: County:

2. ANTICIPATED DATES:

   a. Start:

   b. Complete:

3. PURPOSE OF TCRA:

For example, specific OE hazards to be controlled and populations to be protected.

4. EXECUTING AGENCIES.

   a. Corps District: POC: Telephone:

   b. Huntsville: POC: Telephone:

   c. Contractor: POC: Telephone:

5. SCOPE OF REMOVAL ACTION:

   a. Number of Areas:

   b. Total Acres:

   c. Removal Depths:

d. Other response actions. If other actions are taken in addition to physical removal, list them (e.g., fences, signs, public education, closure, notification of local police, etc).

6. SAFETY CRITERIA:

a. Munition item with greatest Fragmentation Distance:
Calculated Maximum Fragmentation Range (in feet):

b. Q-D: OE Areas: Minimum Separation Distance (in feet):
Team Separation Distance (in feet):

c. Q-D Intentional Detonation Activities (in feet):

d. Q-D Explosives Storage Magazines (in feet):

e. DDESB Approved Engineering Controls in use:

7. Provide Q-D map(s) showing the siting for the OE area(s), explosives storage magazines, and planned or established OB/OD areas.

8. Field operational safety principals are contained in Engineering Pamphlet 385-1-95a, "Basic Safety Concepts and Considerations for Ordnance and Explosives Operations", dated 29 June 2001. This document is located at: http://www.usace.army.mil/inet/usace-docs/eng-pamphlets/ep385-1-95a/toc.htm

GLOSSARY

Section I
Abbreviations

AR.....Army Regulation
ARARs .....Applicable or Relevant and Appropriate Requirements
BEM .....Buried Explosion Module
BRAC .....Base Realignment and Closure
CERCLA .....Comprehensive Environmental Response, Compensation, and Liability Act
CESO.....Corps of Engineers Safety Office
DA .....Department of the Army
DA Pam .....Department of the Army Pamphlet
DDESB.....Department of Defense Explosives Safety Board
DERP.....Defense Environmental Restoration Program
DID.....Data Item Description
DOD .....Department of Defense
EB.....Enclosed Barricade
EE/CA.....Engineering Evaluation/Cost Analysis
EM.....Engineer Manual
EOD.....Explosive Ordnance Disposal
EP .....Engineer Pamphlet
EPA.....Environmental Protection Agency
ER.....Engineer Regulation
ESS .....Explosives Safety Submission
FUDS.....Formerly Used Defense Site
HTRW .....Hazardous, Toxic, and Radioactive Waste
HQDA.....Headquarters, Department of the Army
HQUSACE .....Headquarters, United States Army Corps of Engineers
IRP.....Installation Restoration Program
MACOM.....Major Command
MCX.....Mandatory Center of Expertise
MOFB.....Miniature Open Front Barricade
MGFD.....Munition With The Greatest Fragmentation Distance
MSC.....Major Subordinate Command
MSD .....Minimum Separation Distance
NCP .....National Contingency Plan
NEW.....Net Explosive Weight
NDAI .....No DOD Action Indicated
NTCRA.....Non-Time-Critical Removal Action

OE.....Ordnance and Explosives
OE MCX.....Ordnance and Explosives Mandatory Center of Expertise
OFB .....Open Front Barricade
OSHA .....Occupational Safety and Health Administration
PM .....Project Manager
Q-D.....Quantity Distance
RCRA .....Resource Conservation and Recovery Act
RCWM .....Recovered Chemical Warfare Material
TCRA .....Time-Critical Removal Action
USACE.....United States Army Corps of Engineers
USAESCH.....U.S. Army Engineering and Support Center, Huntsville
USATCES .....U.S. Army Technical Center for Explosives Safety
UXO .....Unexploded Ordnance

Section II
Terms

Action Memorandum
Approves time-critical removal action and also concludes the engineering evaluation/cost analysis. Provides a concise, written record of the decision to select an appropriate removal action. As the primary decision document, it substantiates the need for a removal action, identifies the proposed action, and explains the rationale for the removal action selected.

Active Installations
Installations under the custody and control of DOD. Includes operating installations, installations in a standby or layaway status, and installations awaiting closure under the Base Realignment and Closure (BRAC) legislation. Examples include but are not limited to posts, camps (including National Guard camps), forts, depots, activities, ports, ammunition supply points, basic load ammunition storage areas, and ammunition plants.

Administrative Record
The body of documents that "forms the basis" for the selection of a particular response at a site. Documents that are included are relevant documents that were relied upon in selecting the response action as well as relevant documents that were considered but were ultimately rejected. (ER 1110-1-8153)

Applicable, Relevant, and Appropriate Requirements (ARARs)
Applicable requirements are cleanup standards, standards of control, and other substantive environmental protection requirements promulgated under federal or state environmental law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance found at a CERCLA site. Relevant and appropriate

requirements are cleanup standards that while not “applicable”, address situations sufficiently similar to those encountered at a CERCLA site that their use is well-suited to the particular site.

Base Realignment and Closure (BRAC)
Program governing the scheduled closing of Department of Defense sites. (Base Closure and Realignment Act of 1988, Public Law 100-526, 102 Stat. 2623, and the Defense Base Closure and Realignment Act of 1990, Public Law 101-510, 104 Stat. 1808)

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)
Also known as “Superfund”, this congressionally enacted legislation provides the methodology for the removal of hazardous substances resultant from past / former operations. Response actions must be performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan.

Conventional Ordnance and Explosives
The term “conventional OE” refers to ordnance and explosives (see definition) other than CWM, BWM and nuclear ordnance. (ER 1110-1-8153)

Defense Environmental Restoration Program (DERP)
Established in 1984, DERP promotes and coordinates efforts for the evaluation and cleanup of contamination at Department of Defense installations. (10 U.S.C. 2701)

Design Center
A specified USACE field office assigned a singular technical mission that is permanent and USACE-wide in scope. The designated office is to be considered the “lead activity” in a specialized area where capability needs to be concentrated for maximum effectiveness, economy, and efficiency. The OE Design Center (in coordination with the district PM) will execute all phases of the OE response project after the approval of the INPR unless the removal action is transferred to an approved district. Only the USAESCH OE Design Center is authorized to execute any phase of a Non-Stockpile CWM response. (ER 1110-1-8153)

Districts Approved to Execute OE Removal Actions
These districts are selected and approved by the MSC Commander with concurrence from the OE MCX, trained, and assigned the mission of conducting OE removal actions. The districts are responsible for final removal action execution. (ER 1110-1-8153)

Easement
An easement allows the holder to use the land of another or to restrict the uses of the land. An easement "appurtenant" provides a specific benefit to a particular piece of land. For example, allowing a neighbor to walk across your land to get to the beach. The neighbor's land, the holder of the easement, benefits by having beach access through your land. An easement "in gross" benefits an individual or company. For example, allowing the utility company to come on your land to lay a gas line. The utility company, the holder of the easement, benefits by having use of the land to lay the gas line. An affirmative easement allows the holder to use another person's land in a way that, without the easement, would be unlawful - for example, allowing a use that would otherwise be a trespass. A negative easement prohibits a lawful use of land - for example, creating a restriction on the type and amount of development of land.

Emergency Removal Response Actions
Emergency Removal Response Actions address immediate, unacceptable hazards. These actions are normally accomplished by Explosive Ordnance Disposal (EOD) units and may or may not require USACE support.

Engineering Evaluation/Cost Analysis (EE/CA)
An EE/CA is prepared for all non-time-critical removal actions as required by Section 300.415(b)(4)(i) of the NCP. The goals of the EE/CA are to identify the extent of a hazard, to identify the objectives of the removal action, and to analyze the various alternatives that may be used to satisfy these objectives for cost, effectiveness, and implementability.

Exclusion Zone
A safety zone established around an OE work area. Only project personnel and authorized, escorted visitors are allowed within the exclusion zone. Examples of exclusion zones are safety zones around OE intrusive activities and safety zones where OE is intentionally detonated. (DDESB-KO, 27 January 1990)

Explosive Ordnance Disposal (EOD)
The detection, identification, field evaluation, rendering safe, recovery, and final disposal of unexploded ordnance or munitions.

Explosives Safety Submission (ESS)
The document, which serves as the specifications for conducting work activities at the project. The ESS details the scope of the project, the planned work activities, and potential hazards (including the maximum credible event) and the methods for their control. (EP 1110-1-18)

Explosive Soil
Explosive soil refers to mixtures of explosives in soil, sand, clay, or other solid media at concentrations such that the mixture itself is explosive.

(a) The concentration of a particular explosive in soil necessary to present an explosion hazard depends on whether the particular explosive is classified as "primary" or "secondary." Guidance on whether an explosive is classified as "primary" or "secondary" can be obtained from the OE MCX or Chapters 7 and 8 of TM 9-1300-214, Military Explosives.

(b) Primary explosives are those extremely sensitive explosives (or mixtures thereof) that are used in primers, detonators, and blasting caps. They are easily detonated by heat, sparks, impact, or friction. Examples of primary explosives include Lead Azide, Lead Styphnate, and Mercury Fulminate.

(c) Secondary explosives are bursting and boostering explosives (i.e., they are used as the main bursting charge or as the booster that sets off the main bursting charge). Secondary explosives are much less sensitive than primary explosives. They are less likely to detonate if struck or when exposed to friction or to electrical sparks. Examples of secondary explosives include Trinitrotoluene (TNT), Composition B, and Ammonium Picrate (Explosive D).

(d) Soil containing 10 percent or more by weight of any secondary explosive or mixture of secondary explosives is considered "explosive soil." This determination was based on information provided by the USAEC as a result of studies conducted and reported in USAEC Report AMXTH-TE-CR 86096.

(e) Soil containing propellants (as opposed to primary or secondary high explosives) may also present explosion hazards. (ER 1110-1-8153)

Formerly Used Defense Sites (FUDS)
FUDS includes those properties previously owned, leased, or otherwise possessed by the U.S. and under the jurisdiction of the Secretary of Defense; or manufacturing facilities for which real property accountability rested with DOD but were operated by contractors (Government owned - contractor operated) and which were later legally disposed of. FUDS is a subprogram of the DERP. Restoration of military land was extended to formerly used sites in 1983 under Public Law 98-212. (DOD Appropriations Act of FY84).

Intrusive Activity
An activity, which involves or results in the penetration of the ground surface at an area known or suspected to contain OE. Intrusive activities can be of an investigative or removal action nature. (ER 385-1-95)

Mandatory Center of Expertise (MCX)
An MCX is a USACE organization that has been approved by HQUSACE as having a unique or exceptional technical capability in a specialized subject area that is critical to other USACE commands. Specific mandatory services to be rendered by an MCX are identified on the MCX's homepage. These services may be reimbursable or centrally funded. The USAESCH is the OE MCX for the USACE. (ER 1110-1-8153)

Maximum Credible Event (MCE)
The worst single event that could occur at any one time, with maximum release of a chemical agent from a munition, container, or process as a result of unintended, unplanned, or accidental occurrence. (HQDA Interim Guidance for Biological Warfare Material (BWM) and Non-Stockpile Chemical Warfare Material (CWM) Response Activities)

Military Munitions
All ammunition products and components produced or used by or for the US DOD or the US Armed Services for national defense and security, including military munitions under the control of the DOD, the US Coast Guard, the US DOE, and National Guard personnel. The term military munitions includes: confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DOD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. Military munitions do not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components there-of. However, the term does include non-nuclear components of nuclear devices, managed under DOE's nuclear weapons program after all required sanitization operations under the Atomic Energy Act of 1954, (42 U.S.C. 2011 et seq.), have been completed. (10 U.S.C. 2710)

National Oil and Hazardous Substance Pollution Contingency Plan (NCP)
Revised in 1990, the NCP provides the regulatory framework for responses under CERCLA. The NCP designates the Department of Defense as the removal response authority for ordnance and explosives hazards.

Non-Time-Critical Removal Action (NTCRA)
NTCRAs are actions initiated in response to a release or threat of a release that poses a risk to human health, its welfare, or the environment. Initiation of removal cleanup actions may be delayed for six months or more.

Operational Range
A military range that is currently in service and is being regularly used for range activities. (40 CFR 266.201)

Ordnance and Explosives (OE)
OE consists of either (1) or (2) below:
(1) Ammunition, ammunition components, chemical or biological warfare materiel or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried, or fired. Such ammunition, ammunition components, and explosives are no longer under accountable record control of any DOD organization or activity. (HQDA Policy Memorandum "Explosives Safety Policy for Real Property Containing Conventional OE")

(2) Explosive Soil. See definition under "Explosive Soil." (ER 1110-1-8153)

Project Completion Memorandum (PCM)
The document prepared by the agency executing a FUDS removal action to record the specific removal actions taken at a site. Guidance on preparing this document can be found in Chapter 17, EP 1110-1-18.

Quantity Distance (Q-D)
The quantity of explosives material and distance separation relationships that provide defined types of protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate Q-D tables provided in DOD 6055.9-STD. Separation distances are not absolute safe distances but are relative protective safe distances. Greater distances than those shown in the Q-D tables shall be used whenever possible. (DOD 6055.9-STD)

Removal Action
The cleanup or removal of OE from the environment to include the disposal of removed materiel. The term includes, in addition, without being limited to, security fencing or other measures to prevent, minimize, or mitigate damage to the public health or welfare or to the environment. (ER 1110-1-8153)

Resource Conservation and Recovery Act (RCRA)
Enacted in 1976, RCRA promotes the protection of health and the environment. It regulates waste generation, treatment, storage, transportation, and disposal for facilities currently in operation. The OE removal process is affected by RCRA if OE must be disposed off-site.

Response Action
Action taken instead of or in addition to a removal action to prevent or minimize the release of OE so that it does not cause substantial danger to present or future public health or welfare or the environment. (ER 1110-1-8153)

Stakeholder
Stakeholders include federal, state, and local officials, community organizations, property owners, and others having a personal interest or involvement, or having a monetary or commercial involvement in the real property, which is to undergo an OE response action. (ER 385-1-95)

Time-Critical Removal Action (TCRA)
TCRAs respond to a release or threat of release that poses such a risk to public health (serious injury or death), or the environment, that clean up or stabilization actions must be initiated within six months.

Unexploded Ordnance (UXO)
Military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material and remain unexploded either by malfunction, design, or any other cause. (40 CFR 266.201)

UXO Personnel
Contractor personnel who have completed specialized military training in EOD methods or a recognized and certified DOD equivalent course. Various grades and contract positions are established based on skills and experience. Check with the OE MCX for current ratings.