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**US Army Corps
of Engineers**

HUNTSVILLE DIVISION

**Explosives Safety Submission for
Ordnance and Explosives Removal
and Property Release
Phase One (Areas 1, 2, 3, 4, 5, 6)
Fort Devens, MA**

17 JUNE 1995

**Prepared by
US ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT**

WXD 95062 USA

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1. Purpose: This Explosives Safety Submission (ESS) outlines the safety aspects for the removal of ordnance and explosives (OE) located on Phase One OE removal areas of the Department of Defense (DOD) owned real property at Fort Devens, Massachusetts. This submission is required under the Base Realignment and Closure Act (BRAC) for real property to be released outside DOD control.

2. Scope:

a. Ft. Devens consists of three "Posts".

1. South Post is a large training and live fire area to include ranges, impact areas and an demolition ground. South Post is not included in BRAC. The Army will continue to own South Post.

2. Main Post consists of the Ft. Devens cantonment area. Most of Main Post will be released under BRAC. Part of it will remain under Army Reserve Control.

3. North Post has large wooded areas and is located on the west side of an airport. All of North Post will be released under BRAC.

b. This submission covers selected properties on Main Post and North Post. These properties are described in paragraph 3, and shown on map M-1 in Appendix A as areas 1, 2, 3, 4, 5 and 6. The combined acreage is approximately 755 acres.

c. Additional submissions will be provided to Department of Defense Explosives Safety Board (DDESB) to address OE removal actions and property released on the Phase Two BRAC properties on Main Post and North Post.

3. Description of Area and Past Use Leading to Presence of OE:

a. Area 1 - The area consisting of approximately 255 acres will be transferred to the Federal Bureau of Prisons Medical Center. There were training areas, training facilities, and an anti-tank sub-caliber training range located in Area 1. Munitions found on the surface in this area include Stokes mortars, grenades, and empty 1-gallon chemical land mines.

b. Area 2 - This area consist of approximately 175 acres and is intended to be used for Business and Community Services. In 1957 the area was designated a training area for troop maneuvers. Stokes mortars and rifle grenade parts have been found on this location. Hand grenades were found in the southern area near the Nashua river.

c. Area 3 - This area will be used for rail, industrial and trade related activities. Area 3 consist of approximately 150 acres. The area was designated "Ordnance Area" on range maps dated 1954 and 1957. The buildings located in this area were identified as barracks, motor repair shops, storage and issue warehouse. An igloo was also located in this

area although its storage function is unknown. Stokes mortars have been found in portions of Area 3. The first grenade range established in America was located in this area; craters and trenches are seen in this area on photos dated 1922.

d. Area 4 - Administration buildings for the Job Corps are to be in this area. The area was used for hand grenade practice in the 1930's. In the 1940's, it was used as an anti-tank sub-cal training range and a skeet range. The area occupies approximately 20 acres.

e. Area 5 - The future use for this area will be for Innovation and Technology Business. The buildings located here included the Chemical Warfare Headquarters, chemical warfare storage, and chemical warfare warehouses. The use of the Gas Identification Detonation Sets at Fort Devens is documented in the Archives Search Report, and these sets could have been stored in this area. The area comprises approximately 15 acres.

f. Area 6 - The area consists of approximately 140 acres, and is to be used for Environmental Businesses. This area was designated a training area, and included rifle, machine gun, and anti-tank sub-caliber training ranges. One Stokes mortar, and one empty chemical drum (Type B) were found in this area during the Archives Search Report site visit March 1995.

4. Anticipated Removal Start Date: The contractor is anticipated to complete Phase I sampling on 21 July 1995. The starting date for OE removal action will commence on 2 October 1995. These dates may change as sampling is accomplished and the extent of contamination is determined.

5. Contractor Support: The contractor will be Human Factors Applications, Inc. (HFA). Refer to Appendix B for information concerning contractors responsibilities. HFA is a well established UXO contractor with the Corps of Engineers, and is staffed by competent, qualified ex-Military EOD personnel.

6. Military Explosive Ordnance Disposal Support: The 52nd Ordnance Group (EOD), Fort Gillem, GA will provide support when notified by the Corps of Engineers, Huntsville Division Safety Specialist (CEHND). If an item of ordnance or explosives is encountered that precludes the contractor from detonating it on site, or suspected Chemical Warfare Materiel is encountered, EOD support will be requested by CEHND.

7. U.S. Army Technical Escort Unit Support: Ft. Devens is not a known buried Chemical Warfare Material (CWM) site. However, because chemical agent training is known to have occurred at Ft. Devens, the U.S. Army Technical Escort Unit (USATEU) at Aberdeen Proving Ground, Maryland will be prepared to respond in the event a round suspected to contain CWM is encountered. The USATEU Chemical Safety Plan for this emergency action will be included in the contractor's Work plans. If the presence of CWM is confirmed and USATEU's emergency response action does not remove all of the CWM, then a new Corps of Engineers project for the removal of the remaining CWM from suspect

areas will be initiated, and a safety submission will be provided addressing the CWM removal project.

8. Expected Amounts and Types of Ordnance and Explosives: Complete information on expected types and amounts of OE will be provided after contractors sampling action is completed. Information gathered from the archives search report (ASR), and site visit revealed a variety of ammunition having been used on both the Main Post and North Post. The OE found in the Phase One areas included mortars, rifle and hand grenades, and empty chemical materials. The CWM used in the past for training at Ft. Devens are identified by the archives search report as chemical land mines, gas identification sets, and chemical mortars.

9. Techniques Used to Locate Ordnance and Explosives: The contractor will use magnetometer equipment to locate subsurface anomalies. The Scope of Work for sampling specifies the magnetometers used must be able to detect a Stokes mortar at a depth of four feet. OE determined to be unsafe to move will have it's location marked for in place destruction. See the Contractor Specifications for detailed information. No anomaly review board will be established at this time.

10. Clearance Depths: Sampling is to be accomplished to the depth of four feet. The frost line for the Fort Devens area is four feet on a level grade. The clearance depth will be accomplished to four feet. However, the clearance depth may be modified based on actual conditions encountered during the removal action. A modification will be submitted as an amendment to the approved Explosives Safety Submission if a change to the clearance depth is made.

11. Precautions for Chemical Warfare Materiel: Chemical Warfare Materials have been used on Fort Devens. All munitions will be positively identified by filler, and fuze types and function before items are removed or destroyed. If unidentified munitions are located or suspected CWM is encountered the contractor will cease all operations on the site. The Fort Devens Safety Office, BRAC Environmental Coordinator or their representative, and U.S. Army Engineer Division, Huntsville (CEHND-PM-SO) will be notified. The contractor's Work Plan will be used to provide the guidance which will be followed at first encounter with CWM. Contractor personnel may be required to safeguard the item or area until the arrival of USATEU.

12. Summary of Risk Assessments: Risk Assessment Code (RAC) of 1 has been assigned to the overall area which includes Main, North and South Post.

13. Protective Measures on Site: Appendix D contains the basic guidelines for safety and protective measures on site. Specific requirements of the basic contract will also dictate measures required to safeguard personnel and equipment (Appendix B).

14. Planned Methods for On-Site Disposal: The contractor site-specific work plan will

detail the safest, most cost-effective method of treatment and disposal of OE. The contractor shall dispose of all recovered OE in place or on site, daily where possible and practical to do so. If munitions are encountered that cannot be moved due to its condition and the location prevents disposal in place, then the on-site CEHND Safety Specialist shall be notified, who in turn will request EOD Support. Turn-in of recovered OE related scrap and target related scrap will be accomplished per contract specification, and Fort Devens DRMO policy.

15. Off-Site Demolition: All OE will be disposed of on-site. Military EOD shall have the option of off-site disposal if required, provided all necessary coordination is made.

16. Procedures to Deny Unrelated Personnel Access to OE Removal Work Areas:

Although Fort Devens is a fenced installation, there is an open gate policy which allows free access to most areas. A exclusion zone will be established for each work area. The contractor will ensure that the area is evacuated, and will post guards at locations where unauthorized entry presents a safety hazard as required by contract specifications.

17. Information to be Placed in Land Transfer Documents:

a. Transfer records shall describe the following: past activities which led to OE contamination, the OE removal action, and any residual contamination (if applicable).

b. Deed restrictions will be applied if necessary as discussed below:

(1) The depth of OE will be estimated using site specific information. Site specific information consists of historical records searches, interviews with past and present employees, on site visits, and surface and subsurface sampling. Surface and subsurface sampling is the best single estimator of OE depth.

(2) The clearance depth will be four feet.

(3) If the estimated OE depth is not beyond the clearance depth, the land will be released for unrestricted use from an explosives safety standpoint.

(4) If the estimated OE depth is greater than the clearance depth, the land transfer documents will state that soil disturbance below the four foot removal depth may present explosion hazards. The documents will state that soil disturbance below the clearance depth is permissible only if the property owner first notifies the U.S. Army Engineer District New England, who will (in coordination with the U.S. Army Engineer Division Huntsville) determine if additional, deeper remediation is required in the area to be excavated.

Appendix A

Site Map

Appendix B
Contract Specifications

AWARD / CONTRACT		1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15CFR 700)	RATING	PAGE OF PAGES 1 219
2. CONTRACT (Proc. Inst. Ident.) NO. DACA87-94-D-0019		3. EFFECTIVE DATE 06/01/94	4. REQUISITION/PURCHASE REQUEST/PROJECT NO. PM0030-1612-0082	
5. ISSUED BY U.S. ARMY ENG. DIV., HUNTSVILLE ATTN: CEHND-CT-D/MARY STRINGER P.O. BOX 1600 HUNTSVILLE AL 35807-4301 Mary F. Stringer (205)955-5633	CODE 8013	6. ADMINISTERED BY (If other than Item 5) CODE		

7. NAME AND ADDRESS OF CONTRACTOR (No., street, city, county, State and ZIP Code) HUMAN FACTORS APPLICATIONS, INC. Buckingham Green 4950 Route 202, Bldg. 1, Suite 2A Holicong, PA 18928-0615	Vendor ID: 00011023 Phone: (215) 794-3535 FAX: (215) 794-7353	8. DELIVERY <input type="checkbox"/> FOB ORIGIN <input checked="" type="checkbox"/> OTHER (See below) 9. DISCOUNT FOR PROMPT PAYMENT 00.000% 00 Net 000
		10. SUBMIT INVOICES (4 copies unless otherwise specified) TO THE ADDRESS SHOWN IN: ITEM

CODE 7W639	FACILITY CODE	11. SHIP TO/MARK FOR U.S. ARMY ENG. DIV., HUNTSVILLE ATTN: CEHND-CT-D/MARY STRINGER P.O. BOX 1600 HUNTSVILLE AL 35807-4301	12. PAYMENT WILL BE MADE BY US ARMY ENG. DIV., HUNTSVILLE ATTN: CEHND-RH-F (EXAM) PO BOX 1600 HUNTSVILLE AL 35807-4301
	8013		CODE 4003

13. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: <input type="checkbox"/> 10 U.S.C. 2304(c)() <input type="checkbox"/> 41 U.S.C. 253(c)()	14. ACCOUNTING AND APPROPRIATION DATA See Schedule
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15A. ITEM NO.	15B. SUPPLIES/SERVICES	15C. QUANTITY	15D. UNIT	15E. UNIT PRICE	15F. AMOUNT
	THIS CONFIRMS AWARD LETTER OF 1 JUNE 1994. The Overhead Rate is capped at 62% for the term of the contract. The General & Administrative Expense (G&A) rate is capped at 8% for the term of the contract. See attached Schedule(s)				

ESTIMATED AMOUNT WILL BE \$7,271,579.77 (BASE YEAR) 15G. TOTAL AMOUNT OF CONTRACT ▶ \$ -0-

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(X)	SEC.	DESCRIPTION	PAGE (S)	(X)	SEC.	DESCRIPTION	PAGE (S)
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CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17. <input checked="" type="checkbox"/> CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return 1 copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award / contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)	18. <input type="checkbox"/> AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award / contract. No further contractual document is necessary.
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19A. NAME AND TITLE OF SIGNER (Type or print) Elizabeth H. Theisen, President	20A. NAME OF CONTRACTING OFFICER Danny J. Biggs (205) 955-5903
19B. NAME OF CONTRACTOR BY <i>Elizabeth H. Theisen</i>	20B. UNITED STATES OF AMERICA BY <i>Danny J. Biggs</i> (Signature of Contracting Officer)
19C. DATE SIGNED	20C. DATE SIGNED 16 Jun 94

SECTION C
DESCRIPTION/SPECS./WORK STATEMENT

REMEDATION OF SITES
EAST OF THE MISSISSIPPI RIVER
4 NOV 1992

1.0 OBJECTIVE.

1.1 The objective of this work statement is to address ordnance and explosive waste (OEW) remediation activities on formerly used defense sites (FUDS), on active Department of Defense (DoD) installations, on Defense sites identified under the Base Realign and Closure Act (BRAC) on property adjoining DoD installations, and on other federally controlled/owned sites, which have been impacted by DoD operations. The work required under this work statement falls under the Defense Environmental Restoration Program (DERP). The purpose of this work statement is to provide services for the safe location, identification, and disposal of OEW at various FUDS, BRAC and active DoD installations/federally controlled sites east of the Mississippi River.

1.2 OEW is a safety hazard and constitutes an imminent and substantial endangerment to site personnel and the local populace. During the remediation, it is the government's intent that the contractor dispose of all conventional OEW encountered. OEW removal activities may include site analysis, non-intrusive geophysical surveys (i.e. magnetometer sweeps, ground penetrating radar, etc.), intrusive sampling (i.e. test pits/trenches, etc.), interim removal actions, on-site and off-site OEW disposal, and study/assessment of contaminated sites. These actions may involve both conventional and chemical munitions. These actions will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Final National Contingency Plan (NCP). The main contamination to be dealt with is OEW, attendant hazardous toxic and radiological waste (HTRW) materials associated with OEW or in contact with OEW, and chemical weapons material (CWM) that is contained in munitions, drums, cylinders, landfills, open burning/open detonation (OB/OD) areas, impact areas, or ground spills.

2.0 GENERAL.

2.1 Some of the active DoD installations or FUDS where OEW removal may take place are suspected CWM sites. If the contractor identifies or reasonably suspects CWM during conventional operations, the contractor shall immediately

withdraw from the work area and contact the CEHND Safety Office. The contractor shall secure the site until relieved by the Technical Escort Unit (TEU) or EOD. When working on suspected CWM sites, the contractor shall be responsible for unearthing and identifying ordnance. OEW that is identified as being CWM will be turned over to the standby TEU personnel. TEU personnel are responsible for disposition of CWM. Contractor personnel shall assist TEU and may be responsible for CWM contaminated soil and OEW scrap. Individual task orders will address specific dispositions. Once the CWM item is removed, the contractor shall be directed to either continue removal operations, suspend operations until further notice, or begin demobilization, dependent upon the direction of the Corps of Engineers On Site Coordinator (OSC).

2.2 OEW removal activities may be performed at sites located anywhere in the United States east of the Mississippi River (the states of Minnesota, Wisconsin, Illinois, Indiana, Ohio, Michigan, Kentucky, Tennessee, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia, West Virginia, Pennsylvania, Maryland, Delaware, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, Maine, and the District of Columbia. The sites may be: (1) currently owned or controlled by the Federal Government, either military or civilian agencies, or (2) sites which were formerly owned, leased, or used by the Department of Defense.

2.3 Definitions.

2.3.1 OEW. OEW is anything related to munitions designed to cause damage to personnel or materiel through explosive force, incendiary action, or toxic effects. OEW is: bombs and warheads; guided and ballistic missiles; artillery, mortar, and rocket ammunition; small arms ammunition; antipersonnel and antitank land mines; demolition charges; pyrotechnics; grenades; torpedoes and depth charges; containerized and uncontainerized high explosives and propellants; depleted uranium rounds; military chemical agents; and all similar and related items or components, explosive in nature or otherwise designed to cause damage to personnel or material (e.g., fuzes, boosters, bursters, rocket

motors). Uncontainerized high explosives/propellants or soils with explosive constituents are considered explosive waste if the concentration is sufficient to be reactive and present an imminent safety hazard.

2.3.2 Unexploded Ordnance (UXO). An item of explosive ordnance which has failed to function as designed or has been abandoned, discarded, or improperly disposed of and is still capable of functioning causing damage to personnel or material.

2.3.3 Inert Ordnance. An item which has functioned as designed leaving an inert carrier; an item manufactured inert to serve a specific training purpose; and fragments from UXO.

2.3.4 Explosive Ordnance Disposal (EOD) Personnel. Active duty military EOD personnel.

2.3.5 UXO Personnel. Former EOD personnel.

2.3.6 Access Procedures. Those actions taken to locate exactly and to gain access to UXO.

2.3.7 Quality Control (QC). The contractor's system to manage, control, and document his activities to comply with the contract requirements.

2.3.8 Quality Assurance (QA). The procedures by which the Government fulfills its responsibility to be certain that QC is functioning and the specified end product is realized.

2.3.9 Chemical Weapons Material (CWM). Any ordnance, dirt or scrap that has been potentially contaminated with a chemical compound designed for military operations to kill, seriously injure, or incapacitate persons through its chemical properties.

3.0 SERVICES TO BE PERFORMED.

3.1 General. The Contractor shall, commencing upon issuance of a task order, supply all personnel, tools, equipment, transportation, materials, and supervision (except as otherwise noted or provided) to safely locate, identify, and dispose of OEW/UXO contamination located within the project site. If containerized CWM is found, withdraw from immediate work area and assist Technical Escort Unit personnel. If CWM contaminated soil or groundwater is found, the contractor will be required to conduct remedial action to eliminate the hazard. The Contractor

shall also videotape the site operations and prepare a written report of the Contractor's activities. All tasks to be completed under this contract shall be performed in accordance with applicable provisions of the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1.

3.1.1 The Contractor shall execute the work under the direction of a Contractor Project Manager (CPM) approved by the Contracting Officer. The Contractor Project Manager shall answer all questions from the Contracting Officer pertaining to the tasks during the life of each task order. The Contractor Project Manager shall be responsible for the complete coordination of all administrative and cost accounting details of each task order. All work shall be accomplished with adequate internal controls and review procedures which will eliminate conflicts, errors, and omissions and ensure the accuracy of all output. This position shall not be construed to be the technical lead position.

3.1.2 Period of Service. The Contractor shall complete all work and services under this contract in accordance with schedules that are established in each task order. Submittal dates will be included in the individual task orders. These dates identify when information is due in the Huntsville Division Office and other addressees identified in the individual task orders. The types and numbers of submittals and dates and places for review meetings shall be established by each task order under this contract. The basic contract period shall be for one year with two option years which may be exercised in one year increments in accordance with the option clauses in this solicitation.

3.1.3 Permits. There are no environmental permits applicable to this ordnance work.

3.1.4 Laboratory Capabilities.

3.1.4.1 The Contractor shall use a USACE validated laboratory capable of analyzing explosive samples from bulk deposits and potentially contaminated surfaces. If the contractor desires to furnish an on-site laboratory, the Government, at its discretion, may permit validation. Validation shall be obtained from the following:

US Army Engineer Division, Missouri River

ATTN: CEMRD-ED-EC (Paulette Lewis)
PO Box 103 Downtown Station
Omaha, NE 68101-0103

Phone: 402-221-7494

3.1.4.2 The contractor shall use a DoD certified Chemical Surety Material (CSM) laboratory capable of analyzing suspect CWM soil and water samples. At the discretion of the contracting officer, a mobile laboratory may be required to be brought to the site for CWM analysis by the government. This mobile laboratory shall also be DoD certified for Chemical Surety Material (CSM). Certification shall be obtained from the following:

US Army Chemical Destruction Agency
ATTN: SIFL-CMS (Diana Ricketts)
Aberdeen Proving Ground, MD 21010-5401

Phone: 410-671-3325

3.2 Specific Services. The objective identified above shall be achieved by the Contractor performing in response to task orders issued under the terms of this contract for any or all of the following work (this list is not all inclusive):

3.2.1 Work Plan. (ELIN A001) The Contractor shall prepare and submit a Work Plan for each task order describing the activities to be performed at all areas affected by the task order. The Work Plan shall provide details of the approach, methods, and operational procedures to be employed to perform all necessary operations involving ordnance and surveying. The Work Plan shall include equipment, personal protective equipment (PPE), responsibilities of personnel, resumes of personnel, internal and external communication systems, and onsite and offsite emergency medical arrangements, to include completion of ENG Form 3394 in the event of an accident. A site visit is authorized to assist in the preparation of the Work Plans. During the site visit, particular attention shall be directed to environmental sensitive areas and concerns and will be addressed in the Work Plans. No intrusive activities shall be conducted during the initial site visit. The site visit team shall be accompanied by a Senior UXO Supervisor. No field work, with the exception of the initial site visit, may be performed until the Work Plan is reviewed and approved by the Contracting Officer.

All work shall be performed according to the approved Work Plan. Changes to the Work Plan shall be submitted and approved to be effective. Contractor job titles shall conform to the job titles discussed in this SOW. The Work Plan shall include, the following site specific sub-plans, when applicable:

3.2.1.1 UXO Operational Plan.

3.2.1.2 Safety, Health, and Emergency Response Plan (SHERP). See Subsection 4.0 of this statement of work for detailed requirements. This is required if HTRW or CWM is anticipated.

3.2.1.3 Accident Prevention Plan (APP). An APP shall be required in lieu of a SHERP at sites not covered under the provisions of 29 CFR 1910.120. This APP shall conform to the requirements of EM 385-1-1 and the Accident Prevention Plan Guideline for Ordnance Project in Section J - Attachment B.

3.2.1.4 Surveying and Mapping Requirements. As required in each task order.

3.2.1.5 Site-Specific Environmental Protection Plan. See Subsection 5.0 of this statement of work for detailed requirements.

3.2.1.6 Quality Control Plan. As required in each task order.

3.2.1.7 Equipment Plan (EP). The contractor shall prepare and submit a detailed EP, as a work plan subplan, describing the equipment to be employed to perform all necessary operations. The EP shall describe and quantify both field equipment (such as site trailer, track hoes, and back hoes, trucks, bulldozers, front-end loaders, chainsaws, magnetometers, etc.) and office equipment (such as computer/printer/modem, FAX, copier, 2-way radios, camcorder, telephones, etc.) and consumable supplies (both office and field) intended to be used. The contractor shall describe in the EP the source and rental/acquisition costs for all field and office equipment and consumable supplies. Three quotes must be obtained and provided in the EP for each piece of field and office equipment and the EP must indicate that the vendor with the lowest price quote was used for rental/acquisition. The contractor shall indicate in the EP when rental costs exceed acquisition costs for a particular piece of equipment over the life of the project. In

these instances, the contracting officer may direct the contractor to purchase that equipment. After contracting officer approval of the Work Plans/EP, additional field/office equipment and consumable supplies in excess of \$200 may not be rented/acquired without contracting officer approval.

3.2.1.8 Work, Data, and Cost Management Plan (WDCMP). The contractor shall prepare and submit a WDCMP which describes how the work is to be managed and accomplished. The WDCMP shall contain a schedule for the accomplishment of the tasks. The schedule shall contain milestones for all task deliverables and associated costs, show the task components in their relative chronological positions, and state the intervals between milestones in terms of working days following the previous events. More detailed information in the WDCMP may be required on a task by task basis. The WDCMP shall also consist of the organization structure, the assignment of functions, duties and responsibilities, and functional relationships among organizational elements that will participate in the accomplishment of the tasks.

3.2.1.9 Contamination Control Measures Plan. The contractor shall discuss measures to minimize the release of contaminants during the removal action.

3.2.1.10 Spill Control Plan. See paragraph 5.10 for detailed requirements.

3.2.1.11 The Work Plans and all subplans shall be formatted as follows:

3.2.1.11.1 Chapters shall be numbered sequentially, i.e., Chapter 1, Chapter 2, Chapter 3, etc. Within each numbered chapter, each page shall be numbered sequentially, starting with the specific chapter number, such as with Chapter 1, Page 1-1, 1-2, 1-3, etc. Within each numbered chapter, the paragraphs shall be numbered sequentially, starting with the specific chapter number, such as with Chapter 1, Paragraph 1.1, 1.2, 1.3, 1.3.1, 1.3.2, 1.3.2.1, etc. Within each numbered chapter, any figures, tables, charts shall be numbered sequentially, starting with the specific chapter number, such as with Chapter 1, Figure 1-1, 1-2; Chapter 2, Figure 2-1, 2-2, etc. Work plans will be submitted in a 3-ring binder.

3.2.1.11.2 Appendices, if required, shall be lettered alphabetically, i.e., Appendix A, Appendix B, etc.

Within each alphabetically lettered appendix, each page shall be annotated, such as with Appendix A, Page A-1, A-2, A-3; Appendix B, Page B-1, B-2, etc.

3.2.1.11.3 Every page of the Work Plans and all subplans shall contain a date footer and the task order number. When revisions to the Work Plans or subplans are required, a revision date, task order and/or amendment number will be included in the date footer.

3.2.2 Remediation Activities. Remediation activities to be performed by the Contractor under this contract and subsequent task orders are described in general terms below (this list is not all inclusive). The specific tasks to be performed will be identified in each task order.

3.2.2.1 Perform Site Inspections. Access to areas where field efforts may occur should be investigated.

3.2.2.2 Chemical analysis (both on and off site) for explosives, chemical surety material, and other Target Compound List chemicals may be required. Soil and water samples shall be taken and analyzed for the parameters identified in each task order.

3.2.2.3 Soil and debris shall be excavated as required in each task order.

3.2.2.4 Installation of all applicable support facilities (i.e. site project office, command post, decontamination facilities, roads, and utilities) and applicable exclusion, contamination reduction, and support zones shall be established.

3.2.2.5 Topographic and geophysical surveys.

3.2.2.5.1 Location Surveys and Mapping. The contractor shall provide all engineering services required to provide planimetric maps for each project. The maps shall be at a scale not smaller than one inch = 200 feet, referenced to the North American Datum of 1983 (NAD83) and the North American Vertical Datum of 1988 (NAVD88), and provided both on reproducible (mylar) maps and in a digital format. The work includes, but is not limited to, establishing horizontal and vertical ground controls, aerial photography, plane table surveys, location of utilities, digitized map information, generation of the

planimetric maps, and field verification.

3.2.2.5.2 Geophysical Surveys. The Contractor shall perform geophysical surveys using instruments capable of locating unexploded ordnance, disturbed areas, and underground utilities. The specific requirements will be identified in each task order.

3.2.2.6 On-site work area and site perimeter real-time air monitoring.

3.2.2.7 Set-up of staging and demolition area. Location will be determined by the Contractor and approved by the Government. Primary method of OEW removal shall be detonation on-site.

3.2.2.8 Utilization of both traditional and innovative methods for removal action, for example:

3.2.2.8.1 On-site source control/containment.

3.2.2.8.2 On-site disposal/treatment.

3.2.2.8.3 Off-site disposal/treatment.

3.2.2.9 Costs for feasible disposal of OEW and hazardous waste shall be determined by the contractor for at least three disposal alternatives if three alternatives are available. Feasibility shall be determined according to regulatory requirements, geographical proximity, packaging and handling requirements, and disposal costs. The contractor shall submit this information in a Letter Report (ELIN A002) to the contracting officer for approval of the most feasible disposal method. Following approval, the contractor shall dispose of the OEW and hazardous waste accordingly. This requirement is site specific.

3.2.3 Public Involvement. The Contractor shall assist in conducting public meetings to further inform the public of the purpose of these removal actions and the procedures to be followed and the cooperation requested. A written record of the attendees, questions and answers shall be accomplished and be provided as part of the Removal Report. The contractor shall propose the methodology to accomplish this task in the Work Plans.

3.2.4 Unexploded Ordnance (UXO) Activities.

3.2.4.1 Services.

3.2.4.1.1 The contractor shall provide the necessary UXO personnel and equipment to locate, gain access, identify, recover and if directed, apply final disposal procedures to all surface and subsurface explosive ordnance items located on-site. The procedures utilized during OEW remediation shall comply with those covered in CEHND Safety Concepts and Basic Considerations for UXO (Section J - Attachment A).

3.2.4.1.2 UXO Operating Plans shall be prepared and submitted as a part of the Site Work Plan. This plan shall provide details of the approach, methods, and operational procedures to be employed at each site. The plan shall describe the brands of ordnance locators to be used, the proposed layout of grid systems, the proposed system and schedule of search, disposal activities, and the contractor's UXO QC procedures.

3.2.4.1.3 Communications. The Contractor shall supply two types of communications equipment. The communication equipment must be compatible with the site location and local communications requirements.

3.2.4.1.3.1 The Contractor shall provide internal communications to be used by the individual work teams and the command post, the staging area, and transportation assets. This equipment shall be Motorola MT 1000, or equivalent, with programmable frequencies and telephone key pad or equivalent. In addition, a base station radio with a telephone patch capability shall be provided, along with necessary antenna, and will be compatible with the MT 1000s or equivalent.

3.2.4.1.3.2 The Contractor shall provide a minimum of three commercial telephone lines and telephone/FAX equipment into the command post. One of these telephone lines shall be used with the base station radio as a radio patch system.

3.2.4.1.4 If an UXO is encountered that cannot be moved due to its condition and the location prevents disposal in place, then CEHND-ED-SY shall be notified, who in turn will request EOD support.

3.2.4.1.5 If an UXO is encountered that is tentatively identified as containing a toxic military chemical

agent filler, operations shall cease in the area and CEHND-ED-SY shall be notified immediately, who in turn will request EOD support.

3.2.4.1.6 If burning/detonating operations cannot be conducted on-site, the contractor shall accomplish the packing and transportation of UXO to an approved storage or disposal area. Transportation of UXO shall be accomplished in accordance with all applicable Federal, State, and local laws and regulations.

3.2.4.1.7 A daily summary of all UXO operations and UXO encountered shall be included in the Removal Report.

3.2.4.2 Qualifications and Job Descriptions. All UXO personnel, with the exception of the UXO Assistant, shall be graduates of the U. S. Naval Explosive Ordnance Disposal (EOD) School, Indianhead, MD. (See paragraph 3.2.4.2.4) No foreign equivalent training is acceptable. Current certification in accordance with 29 CFR 1910.120(e) shall be site specific. Resumes of all UXO personnel shall be submitted to CEHND-ED-SY for approval. All UXO personnel, regardless of position, shall have never been removed from an EOD position because of personnel reliability reasons. Federal military and civilian employees shall not be employed by the Contractor in performance of any work under the contract, e.g. during off-duty hours, regular hours, or while on annual leave. Federal employees to be provided by the Government for performance of Government obligation will be engaged by the Government in their official capacities.

3.2.4.2.1 SENIOR UXO SUPERVISOR. This is the individual who has the direct responsibility and is the technical lead for all UXO operations on the site. This individual can also be dual-hatted as the Site Safety Officer. This individual shall have documented experience supervising multiple-team operations and documented experience supervising range clearance operations. This individual shall have at least 15 years EOD/UXO experience. Three years of documented civilian contractor UXO experience may be substituted for 3 years of active duty military EOD experience. Twelve years of active duty military EOD experience is not waivable for this position.

3.2.4.2.2 UXO SUPERVISOR. This individual supervises an UXO Sweep Team/Brush Removal Team/Survey Team, etc. This individual shall have documented experience in range clearance

operations and supervising personnel. This individual shall have at least 7 years combined active military EOD and contractor UXO experience. Three years active duty military EOD experience is not waivable for this position.

3.2.4.2.3 UXO SPECIALIST. This individual shall have more than 3 years active duty military EOD experience. A UXO Specialist may be an UXO Assistant with at least 5 years combined military EOD and contractor UXO experience. Three years of active duty military EOD experience is not waivable for this position.

3.2.4.2.4 UXO ASSISTANT. This individual has less than 3 years active duty military EOD experience or may be a graduate of the EOD Assistant Course at Redstone Arsenal AL or Eglin AFB FL. An EOD Assistant cannot fill a position above the UXO Specialist level. An UXO Assistant shall not perform an UXO Task without the direct supervision of an UXO Supervisor.

3.2.4.2.5 QUALITY CONTROL SPECIALIST. This individual shall have the same minimum prerequisites as the UXO Supervisor.

3.2.4.2.6 SITE SAFETY OFFICER. This individual shall have the same minimum prerequisites as the UXO Supervisor.

3.2.4.2.7 MAGNETOMETER/HEAVY EQUIPMENT OPERATOR. A magnetometer and/or heavy equipment operator need not be an UXO person, but shall have the necessary training and documented experience to operate the assigned equipment.

3.2.4.3 Special Considerations. Contractor or subcontractor personnel are not authorized to handle explosive ordnance that contains chemical agent or CSM as defined in AR 190-59.

3.2.4.4 Applicable Regulations. The Contractor shall comply with the provisions of the following regulations (this list is not all inclusive):

3.2.4.4.1 TM 9-1300-206, Ammunition and Explosive Standards.

3.2.4.4.2 DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards.

3.2.4.4.3 AR 190-59, Chemical Agent Security Program.

3.2.4.4.4 EM 385-1-1, Safety and Health Requirements Manual.

3.2.4.4.5 Pertinent government furnished unclassified TM 60-series publications.

3.2.4.4.6 DoD 4160.21-M, Defense Utilization and Disposal Manual.

3.2.5 Scrap Turn-in. The contractor shall furnish all necessary personnel and equipment to turn-in all recovered inert ordnance and non-ordnance related scrap metal to the nearest Defense Reutilization and Marketing Office (DRMO). Ordnance related scrap shall be segregated from non-ordnance related scrap. Venting shall be accomplished as required. Turn-in documentation shall be accomplished in accordance with DOD 4160.21M. The methodology to accomplish this task shall be proposed in the UXO Operating Plan.

3.2.6 Presentations and Meetings. Frequency and locations of presentations and meetings shall be identified in each task order.

3.2.7 Site-Specific Removal Report. The Contractor shall prepare and submit a site-specific Removal Report after completion of all field activities covering all operations and activities conducted under each task order. The report shall be prepared in accordance with DD Form 1664 (A004) in Section J and include the following:

3.2.7.1 Surveying and Mapping Data to be delivered are as follows: The original of all field books, layout sheets, computation sheets, abstracts,, and computer printouts. All of these items shall be suitably bound, and clearly marked and identified; a tabulated list of all control points showing the adjusted coordinates and elevations (to the closest one hundredth of a foot and one thousandth of a meter) established and/or used for this survey; a "Report on Establishment of Survey Mark" (description card) on each permanent control monument established and/or used for the survey. In addition to the name or I.D. number of the monument, the cards should show the adjusted coordinates and the adjusted elevations (to the closest 0.01 foot and 0.001 meter), a written description for locating the monument,

and a sketch showing how to locate the monument. These description cards shall be submitted on 5" X 8" cards or 8 1/2" X 11" sheets of bond paper; all unique items created and/or used to create the end products; all maps shall be plotted at a scale not smaller than one inch = 200 feet on 30 inch by 42 inch (standard "F" size drawing) mylar sheets; one copy each of each magnetic data tape; and three copies of each aerial photograph, five reproducible copies (mylar) of the aerial photo index and all of the aerial photograph negatives.

3.2.7.2 Detailed accounting by work area of all UXO and UXO related materials located and disposed of. The UXO accounting shall differentiate between live, inert, and slugs. Disposal method shall be described and an accounting of the amount of explosives used for demolition shall be provided.

3.2.7.3 A daily journal for the project site shall be opened upon first arrival for field operations and closed after contractor demobilization at the project site. The contractor shall maintain a daily record of which work areas are active and of all other activities on site not endemic to any specific work area. Activities endemic to a specific work area shall be recorded on a daily basis and indexed.

3.2.7.4 A recapitulation of exposure data. This shall include total number of man-hours worked on-site, total motor vehicle mileage, total number of flying hours, and number of flights.

3.2.7.5 QC documentation.

3.2.7.6 All DRMO turn-in documentation.

3.2.7.7 4"x6" (10x15cm) color photographs shall be included in the Report depicting major action items and UXO discoveries. The original Final Removal Report furnished to CEHND shall include original photographic prints and negatives. Photographs contained in draft submissions and copies of final submissions shall be color photocopies. Number of required photographs will be determined in each task order.

3.2.7.8 Public meeting written record.

3.2.7.9 A financial breakdown by work area and task of all costs and labor hours (by labor category) used to perform the task order.

3.2.7.10 A video tape showing major action items and UXO discoveries. The video tape shall be hi-grade VHS color tape with voice narration describing the actions being taped, and a minimum of 60 minutes in length. The original video tape shall be submitted as part of the original Final Removal Report to CEHNDPM-OT.

3.2.7.11 The Contractor shall show location of search sweeps and significant UXO findings with respect to all surface features within the project area on a planimetric or topographic map at a minimum scale of 1 inch = 200 feet [1:2400].

3.2.7.12 Copies of any accident/incident reports.

3.2.7.13 Description and results of any laboratory analyses performed.

3.2.8 Environmental Report. _ An Environmental Report (ELIN A003) for the types of removal actions identified in each task order shall be prepared. This report shall be prepared in accordance with NEPA as identified in 40 CFR 1500-1508 and AR 200-2, and AR 415-15. It is intended that this report be an abbreviated Environmental Assessment, limited to approximately 20 pages. The site specific Removal Report shall incorporate this report by reference, if appropriate.

3.3 Contract Deliverables. The following contract deliverables shall be submitted during the course of individual task orders:

3.3.1 Work Plan (ELIN A001) (Draft and Final). Submit prior to commencing field work.

3.3.2 Disposal Feasibility Letter Report (ELIN A002). Submitted prior to commencing on-site disposal activities.

3.3.3 Environmental Report (ELIN A003) (Draft, Draft-final, Final). Submitted as specified.

3.3.4 Site Specific Removal Report (ELIN A004) (Draft, draft-final, Final). Submitted at completion of field activities.

3.3.5 Accident/Incident Report. (ELIN A005) Submitted as needed.

3.3.6 Progress/Meeting Reports. (ELIN A006) Submitted not later than 5 working days after presentation/meeting.

3.3.7 Status Report. (ELIN A007) Submitted monthly, not later than 10 working days after each calendar month.

3.3.8 Telephone Conversation/Correspondence Records. (ELIN A008) Submitted monthly, not later than 10 working days after each calendar month.

3.3.9 Cost/Schedule Control System Report (ELIN A009). Submitted monthly not later than 5 working days after each calendar month.

4.0 SAFETY AND HEALTH PROGRAM. Site activities in conjunction with this project may pose unique safety, chemical, explosive, and/or biological exposure hazards which require specialized expertise to effectively address and eliminate. The Contractor shall be responsible for preparing and implementing an effective Safety and Health Program in cooperation with the Huntsville Division, Contracting Officer and the Commander, Technical Escort Unit (TEU), when applicable. Due to the hazardous nature of this work and safety hazards associated with this type of operation, a thorough evaluation of the site and implementation of safety procedures is necessary to reduce the potential for accidents and to minimize risks to the workers. The Safety Program shall describe a comprehensive Site-Specific Safety, Health, and Emergency Response Plan (SHERP) and be submitted as part of the Work Plan. A SHERP is required if HTRW or CWM is anticipated at a site; otherwise, an Accident Prevention Plan (APP) is appropriate. The SHERP shall be tailored to the concerns at a particular site or sites and the nature of the effort being accomplished with a particular task order. All safety procedures, precautions, and personal protective equipment to be employed during cleanup shall be specified in detail in the Contractor's SHERP. No field work shall begin until the SHERP has been approved in writing by the Contracting Officer. The contractor shall ensure that all safety and health provisions are followed by their subcontractors, suppliers and support personnel.

4.1 Requirements. The SHERP shall comply with all federal, state, and local health and safety requirements, e.g., the Occupational Safety and Health Administration (OSHA) requirements (29 CFR 1910 (29 CFR 1910.120 final rule published in Federal Register March 6, 1989, effective March 6, 1990) and

1926), the U.S. Army Corps of Engineers Safety and Health Requirements Manual (EH 385-1-1), and the U.S. Army Materiel Command Safety Manual, AMC-R 385-100.

4.2 Organization/Administration. The Contractor shall assign responsibilities for safety activities and procedures. An outline of the safety chain of command shall be provided. Qualifications, including education, experience, certifications and training in safety and health for all personnel engaged in safety and health functions shall be documented in the SHERP or APP.

4.2.1 The Contractor shall utilize the services of an experienced Certified Industrial Hygienist (CIH) to implement and oversee the Safety and Health Program and to develop, implement, and sign all SHERPs. Any changes to the established Safety and Health Program or SHERPs shall be at the direction and approval of the CIH, with concurrence of the Contracting Officer. The CIH will not necessarily be required to be on-site during remedial activities, but shall be readily available for consultation when required. A CIH is not required for APP preparation.

4.2.2 In addition, the Contractor shall utilize a trained, experienced Site Safety Officer (SSO) to assist and represent the CIH in the continued implementation and enforcement of the approved SHERPs and APPs. The SSO shall have the on-site responsibility and authority to modify and/or halt work, or remove personnel from the site if working conditions which may affect on-site/off-site safety and health change. The SSO shall be the main contact for any on-site emergency situation. Except in an emergency, the SSO may modify the approved SHERP or APP only after consultation and concurrence of the CIH and the Contracting Officer.

4.3 Standing Operating Procedures (SOPs). The Contractor shall outline SOPs for preventing accidents, and protecting personnel from injury and occupational illness for all operations having a significant accident potential. Approved SOPs will be made available to prime and subcontractor personnel for personnel information guidance and compliance.

4.4 Identification of Hazards. The Contractor shall review existing records and data to identify potential chemical, explosive, and/or physical hazards associated with the designated excavation and sampling sites and to evaluate their impact on field operations. Sources and potential exposure

pathways of each identified hazard shall be described. The Contractor shall develop and justify action levels for controlling worker exposure to the identified hazards through designation of personal protection levels and subsequent upgrade/downgrade of such levels in accordance with appropriate requirements.

4.5 Personal Protective Equipment. Based on hazards analyses, the Contractor shall describe in detail and provide appropriate personal protective equipment (PPE) to insure workers, official visitors and government employees are not exposed to levels greater than the action level for identified hazards for each operation stated for each work zone. The level of protection shall be specified in the SOP for each operation and shall be in compliance with all requirements of 29 CFR 1910. The Contractor shall provide and maintain all PPE.

4.6 Safety and Health Training. The Contractor shall develop a training program to inform employees, official visitors and government employees of the special hazards and procedures (including PPE, its use and inspection) to control these hazards during field operations. This program shall be consistent with the requirements of 29 CFR 1910.120. Employees shall be trained in emergency procedures, areas of restricted access, methods of decontamination, and general safety. All prime and subcontractor personnel shall complete this program prior to beginning on-site work. The Contractor shall keep individual training records on all workers associated with the project and submit a copy of these records in the draft SOP.

4.7 Monitoring.

4.7.1 The Contractor shall coordinate with the Contracting Officer and the Commander TEU in determining the amount and type of GFE-type monitoring equipment that can be provided. The Contractor shall coordinate with the Contracting Officer and the Commander TEU as to the placement and number of monitoring devices at each site covered in this scope of work. In addition, the Contractor shall provide continuous monitoring of the identified hazards associated with the sites for controlling worker exposure during field operation. Air monitoring results shall be used to determine the appropriateness of PPE and need to upgrade or downgrade the established levels of protection based on established action levels. When applicable, National Institute for Occupational Safety and Health (NIOSH) approved sampling and analytical methods must be used and only

laboratories participating and meeting the requirements of the AIHA Proficiency Analytical Testing Laboratory Accreditation programs shall be used to conduct necessary analyses.

4.7.2 Air Monitoring Sub-Plan. When required, the Contractor shall prepare and submit an Air Monitoring Sub-Plan as part of the Work Plan. The Contractor shall provide in the Sub-Plan a description of the equipment and procedures to be used for the monitoring of air quality during the clean-up phases. Air quality monitoring will be required, at a minimum, of the ambient air during excavation phases using portable air monitoring instrumentation. This emissions monitoring shall be conducted on a real time basis using an organic vapor detection unit. The Contractor shall identify in the Sub-Plan specific air sampling equipment, locations and frequencies.

4.8 Emergency Procedures. The Contractor shall establish procedures to take emergency action in the event of immediate hazards, i.e., a chemical agent leak or spill, fire, detonation, or personal injury. The Contractor designated SSO shall serve as the emergency coordinator. Personnel and facilities providing support in emergency procedures shall be identified. Specify the emergency equipment to be present on-site and the Emergency Response Plan procedures, as required by 29 CFR 1910.120 (1) (1) (ii). The Emergency Response Plan shall be included as part of the SHERP or APP.

4.9 Medical Surveillance. (Site Specific) All on-site Contractor personnel shall have medical examinations meeting the requirements of 29 CFR 1910.120 prior to commencement of work including establishment of baseline cholinesterase. The medical examination results shall be evaluated by a board-certified or board-eligible licensed physician practicing occupational medicine to determine if the individual is physically fit for the work to be performed and that no physical condition or disease would be aggravated by exposure to the identified hazards. Medical records shall be available for review by the Contracting Officer upon request. Specify exam content and frequency.

4.10 First Aid. The Contractor shall provide appropriate emergency first aid kits and equipment suitable for treatment of exposure to identified hazards, including chemical agents. A vehicle suitable for transport shall be made available to transport injured workers to medical facilities identified in the Emergency Procedures. At least one person trained in First Aid/CPR is to be on site at all times during site operations. As

a minimum, an emergency eyewash and shower shall be available on-site.

4.11 Accident Prevention Plan. An accident prevention plan shall be prepared as discussed in Appendix Y of COE EM 385-1-1. The Contractor shall immediately notify the Contracting Officer of any accident/incident. Within two working days of any reportable accident the Contractor shall complete and submit to the Contracting Officer an Accident Report on ENG Form 3394 in accordance with AR 385-40 and HQUSACE supplement 1 to that regulation. This APP shall replace the SHERP on a conventional, non-HTW OEW project.

4.12 Safety Inspections. The Contractor shall devise a systematic method of conducting daily safety inspections to evaluate operating areas and personnel performance with the goal of eliminating hazards. Copies of all safety inspections shall be included in the monthly status report (ELIN 0007). The Contractor SSO shall accompany any Federal or State regulatory official performing onsite evaluations of Contractor operation. The Contractor shall cooperate to the maximum extent possible with such safety regulatory personnel but shall not deviate from the Government-approved plan. Only UXO personnel are allowed inside the exclusion zone during UXO operations.

4.13 Site and Control Layout. Include a site map, work zone delineation, on/off-site communications, site access controls, and security (physical and procedural). If applicable, the Contractor will determine three areas; exclusion, contamination reduction and support, for each work site. No person shall be allowed entry into the exclusion and contamination reduction areas unless in compliance with Sections 4.5, 4.6, and 4.9.

4.14 Health and Safety Work Precautions. Buddy system, eating and drinking precautions, smoking and ignition sources, potentially hazardous noise, explosive atmosphere, illumination, flora and fauna hazards, heat or cold stress, confined space entry precautions, eye wash stations, fire extinguishers, sanitation, and routine safety inspections shall be discussed.

4.15 Personnel and Equipment Decontamination. Decontamination facilities and procedures for personnel protective equipment, sampling equipment, and heavy equipment shall be discussed in detail, if applicable. The Contractor shall coordinate with the Contracting Officer and the Commander TEU as to the assistance the contractor will provide to TEU personnel and site

decontamination. The contractor will provide all personal, area, and equipment decontamination as necessary up to the point in time that CSM is encountered. When CSM is encountered the contractor shall withdraw until requested to support the Commander TEU.

4.16 Logs, Reports, and Recordkeeping. The contractor shall maintain safety inspection reports, accident/incident reports, medical certifications, training logs, monitoring results, etc. All exposure and medical monitoring records to be maintained according to OSHA standard 29 CFR 1910 and 1926.

4.17 SHERP Format. (As applicable)

STAFF ORGANIZATION

- Project Manager
- Certified Industrial Hygienist
- Site Safety Officer
- First Aid/CPR Personnel
- UXO Field Personnel
- Subcontractor Personnel

HAZARD COMMUNICATION AND TRAINING

- Comprehensive Health and Safety Indoctrination
- Specialized Training
- Visitor Training
- Pre-Investigation Health and Safety Briefing
- Post-Investigation Health and Safety Briefing
- Morning Safety Meetings

MEDICAL SURVEILLANCE

- Medical Surveillance
- Licensed Occupational Physician
- Medical Examinations

EXPOSURE MONITORING

- Environmental and Personnel Monitoring
- Meteorological Monitoring
- Sampling and Analytical Methods
- Heat/Cold Stress Monitoring

HEALTH AND SAFETY EQUIPMENT

- Personal Protective Equipment
- Environmental Monitoring Equipment
- Decontamination Equipment
- Emergency Equipment

Emergency-Use Respirators
Spill Control Equipment
Fire Extinguishers
First Aid Equipment and Supplies
Emergency Eye Wash/Shower (ANSI Z358.1)
Personnel Hygiene
Personnel Decontamination
Communications

STANDARD OPERATING PROCEDURES

Health and Safety Site Plan
Site Description
Site Inspection
Site Security
Site Entry Procedures
Responsibilities
Work Zones
Activity Hazard Analysis
Accident Prevention
Accident Reporting
Safe Work Practices
Confined Space Entry Procedures
Material Handling Procedures
Levels of Protection
Decontamination Procedures
Emergency Information
Emergency Response Plan
Illumination
Sanitation
Sampling
Land Survey
Laboratory Analysis
Logs, Reports, and Recordkeeping
Tick Control
Flora and fauna
Ordinance/CSH/CWM

5.0 ENVIRONMENTAL PROTECTION.

5.1 The Contractor shall perform all work in such a manner as to minimize the pollution of air, water or land and to control noise and dust within reasonable limits. This subsection covers performing all work required for the protection of the environment during the remediation operations except as specified in other Sections of this contract in the individual task orders.

5.2 As part of the Work Plan, the Contractor shall submit a Site Specific Environmental Protection Plan.

5.3 Environmental Survey. Prior to start of any on-site remediation activities, the Contractor and the Contracting Officer shall make a joint condition survey after which the Contractor shall prepare a brief report indicating on a layout plan the condition of trees, shrubs and grassy areas immediately adjacent to the site of the work and adjacent to his assigned storage area and access route(s) as applicable. During this survey, the Contractor and the Contracting Officer shall attempt to identify any wetlands, endangered species, special habitat or other protected areas and indicate such on the layout plan. This report will be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. This survey shall be the basis for the Site-Specific Environmental Protection Plan.

5.4 Protection of Land Areas. Except for any work or storage areas and access routes specifically assigned for the use of the Contractor under this contract, the land areas outside the limits of the permanent work performed under this contract shall be preserved in their existing condition. The Contractor shall confine his removal activities to areas defined for work in the individual task orders or specifically assigned for his use. Storage and related areas and access routes required temporarily by the Contractor in performance of the work will be assigned by the Contracting Officer. No other areas shall be used by the Contractor without the written consent of the Contracting Officer.

5.5 Protection of Trees and Shrubs. The Contractor shall take all actions necessary to protect and prevent damage to all trees, shrubs and vegetation not identified for removal. No ropes, cables or guys shall be fastened to or attached to any nearby trees for anchorages.

5.5.1 Tree Protective Structures. Where, in the opinion of the Contracting Officer, trees may be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or operations, the Contracting Officer may direct that the Contractor provide protection of such trees by placing boards, planks, poles or fencing around them.

5.5.2 Restoration of Damaged Trees. Any tree scarred or damaged by the Contractor's negligence shall be restored as

nearly as possible to its original condition at the Contractor's expense. All scars made on trees not designated on the plans for removal by the construction operations shall be coated as soon as possible with as approved tree wound dressing. Trees that are to remain, either within or outside established clearing limits, that are damaged by the Contractor's negligence so as to be beyond saving in the opinion of the Contracting Officer, shall be immediately removed, if so directed, and replaced with a nursery-grown tree of the same species and size at the Contractor's expense.

5.6 Protection of Water Resources. The Contractor shall control the transfer, use and disposal of fuels, oils and other hazardous materials in accordance with applicable Federal, State, County and Municipal laws concerning pollution of air, water and soils while performing work under this contract. Special measures shall be taken to prevent chemicals, fuels oils or other harmful materials from entering public waters. Water used on-site shall not be allowed to leave the site untreated without the written approval of the Contracting Officer.

5.6.1 Run-On Controls. The Contractor shall take all reasonable precautions to prevent run-on from entering areas of the site where the water may be exposed to contaminated soils, water or waste. Such precautions may include grading, temporary dikes sandbags or other actions as directed by the Contracting Officer.

5.6.2 Run-Off Controls. Appropriate controls shall be put in place by the Contractor to prevent or minimize rainfall from contact with hazardous materials stored on site. This would include activities such as covering piles of excavated material with plastic coverings. Where practical excavated areas shall be diked and covered to prevent rainfall and run-off from entering. In those areas where run-off shall be contained and collected before it leaves the site. This run-off shall be documented to be non-hazardous or it shall be treated and/or disposed of accordingly.

5.6.3 Sediment Controls. Sediment which may contain significant levels of contamination shall also be contained and collected before it leaves the site. Disposal requirements will conform to all applicable Federal, State, and local regulations.

5.7 Waste Disposal. (Non-OEW) Wastes generated under this contract will generally fall into one of two categories: (1)

uncontaminated, or (2) contaminated.

5.7.1 Uncontaminated wastes shall be removed from the site by the Contractor and disposed of at an approved facility. No wastes are to be burned, buried or otherwise left on-site without the written approval of the Contracting Officer.

5.7.2 Contaminated wastes may consist of a wide variety of materials originating at the site or used on the site. Examples include sampling wastes or decontamination fluids as well as solid and liquid wastes originating at the site. All wastes shall be packaged, labeled, stored and disposed of as required by Federal, State and local laws and regulations. For each Task Order, disposal of hazardous wastes shall be tracked in accordance with the manifest requirements contained in 40 CFR 262, Subpart b and DOT shipping requirements.

5.8 Burning. Materials shall not be burned on site without the written authorization of the Contracting Officer. If the Contractor elects to dispose of the uncontaminated waste materials off-site, by burning, he shall make his own arrangements for such burning area and shall conform to all local regulations.

5.9 Dust Control. The Contractor shall maintain all excavations embankments, stockpiles, access roads, plant sites, waste areas and all work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance. Approved temporary methods will be permitted to control dust. Dust Control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. Air monitoring for documentation and for establishment of action levels may be required.

5.10 Spill Control. (Non-OEW) The Contractor shall prevent spills and provide contingency measures for cleanup of potential spills during performance of this contract. The Contractor shall:

5.10.1 Prepare and submit to the Contracting Officer for approval a Spill Control Plan as part of the Environmental Protection Plan. This plan shall identify potentials for spills, preventative and spill actions to be taken, responsibilities and materials to be used. An adequate supply of the materials identified must be available at the site.

5.10.2 Take adequate measures to prevent spills during excavation, handling, packing transportation, storage or other operations performed during this contract.

5.10.3 Provide all emergency measures required to contain any spillages and to remove all materials that become contaminated due to spillage. If the spill is due to the negligence of the Contractor, then all cleanup costs shall be paid by the Contractor at no cost to the Government.

5.10.4 Provide all decontamination measures required as a result of the removal of spilled materials. Decontamination residues shall be properly disposed of directed by the Contracting Officer.

5.10.5 At a minimum, the following emergency procedures shall be performed by the Contractor if a spill occurs:

5.10.5.1 Immediately (within 1 hour) notify the Contracting Officer.

5.10.5.2 Take immediate measures, utilizing properly protected personnel, to control and contain the spill.

5.10.5.3 Isolate the hazardous area and keep all unnecessary personnel out of the area.

5.10.5.4 Stay upwind and stay out of low areas.

5.10.5.5 Keep combustibles away from the spill material.

5.10.5.6 Use water spray or other approved methods, if appropriate, to reduce vapors gases and/or dust emissions.

5.11 Corrective Action. The Contractor shall, upon receipt of a written notice of noncompliance with any of the aforementioned provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be reimbursable under this contract nor shall it be made the subject of a claim for extension of time or for excess costs of damages by the Contractor unless it was later determined that the Contractor was in compliance.

5.12 Post-Remediation Clean-up Obligation. The Contractor shall, unless otherwise directed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations for temporary structures, stockpiles of excess or waste materials and other vestiges of construction prior to final acceptance of the work. The disturbed areas shall be graded and filled and the entire area seeded.

6.0 SITE SECURITY. The Contractor shall provide site security (e.g. fencing or guard service) as required by each individual task order. However, at a minimum the Contractor shall maintain the site and all other Contractor controlled areas in such a manner as to minimize the theft of property, the risk of injury or accident to site personnel or others who may be in the area. Work on or near roadways shall be carefully marked with lights and barricades meeting State and local regulations or where such regulations are not applicable are adequate to minimize the risk of an accident. Open excavations which pose a danger to site personnel or others shall be fenced to prevent accidental entry. Side slopes of excavations shall be shored or left at a safe angle repose. All equipment, when not in operation, shall be left in a safe manner (wheels blocked and buckets on the ground). Near residential areas where there may be children, special consideration will be given to site security/safety needs.

7.0 PUBLIC AFFAIRS. The Contractor shall not publicly disclose any data generated or reviewed under this contract. The Contractor shall refer all requests for information concerning site conditions to the Contracting Officer for comment. Requests for information concerning the contract shall be referred to the Contracting officer for comment. Reports and data generated under this contract shall become the property of the Department of Defense and distribution to any other source by the Contractor, unless authorized by the Contracting Officer, is prohibited.

8.0 CONTRACTOR KEY PERSONNEL QUALIFICATIONS. In addition to the previous stated qualifications for UXO personnel, the contractor shall furnish the necessary qualified staff to accomplish the objectives and tasks of this statement of work. The key personnel for this contract are: Project Manager, Senior UXO Supervisor, UXO Supervisor, UXO Specialist, Site Safety Officer, and the Quality Control Specialist. Resumes shall be furnished which address the training and experience for all key

personnel involved in the accomplishment of this contract.

Quantities of key personnel are based on the assumption that five projects are running concurrently. The key personnel listing and the numbers of resumes to be provided for each of these disciplines are as follows:

Project Manager	5
Senior UXO Supervisor	5
UXO Supervisor	5
UXO Specialist	20
Site Safety Officer	5
QC Specialist	2

END OF SECTION C

Appendix C

Risk Assessment Worksheet

"This worksheet addresses risks posed by Ft. Deven's Main, North and South Posts in their current condition; i.e., before the planned OE removal action on Main and North Post."

RISK ASSESSMENT PROCEDURE FOR
ORDNANCE AND EXPLOSIVE WASTE (OEW) SITE

Site Name	<u>FORT DEVENS</u>	Rater's Name	<u>ROCHELLE ROSS</u>
Site Location	<u>AYER, MASSACHUSETTS</u>	Phone No.	<u>314-331-8784</u>
DERP Project#	<u>BRAC BASE</u>	Organization	<u>CELMS-PM-M</u>
Date Completed	<u>APRIL 28, 1995</u>	RAC Score	<u>1</u>

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at Formerly Used Defense Sites. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, hazard severity and hazard probability. Personnel involved in visits to potential OEW sites should view the CEHND videotape entitled "A Life Threatening Encounter: OEW."

Part I. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPE OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition

	VALUE
Medium/Large Caliber (20mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, Explosive	10
Rockets, Guided Missiles, Explosive	10
Detonators, Blasting Caps, Fuzes, Boosters, Bursters	6
Bombs, Practice (w/spotting charges)	6
Grenades, Practice (w/spotting charges)	4
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	1
Conventional Ordnance and Ammunition (Select the largest single value)	<u>10</u>

What evidence do you have regarding conventional OEW? Stokes Mortars, grenades, 100-lb bombs and other ammunition have been found on the North and Main Posts. 3-3" Stokes were found March 1995.

B. Pyrotechnics (For munitions not described above)

VALUE

Munitions (Container) containing
White Phosphorus or other
Pyrophoric Material (i.e.,
Spontaneously Flammable) 10

Munitions Containing A Flame
or Incendiary Material (i.e.,
Napalm, Triethylaluminum Metal
Incendiaries) 6

Flares, Signals, Simulators, Screening
Smokes (other than WP) 4

Pyrotechnics (Select the largest single value) 10

What evidence do you have regarding pyrotechnics? White Phosphorous
grenades, flame throwers, screening smokes, and simulators have been used
and stored at Ft. Devens.

C. Bulk High Explosives (Not an integral part of conventional ordnance;
uncontainerized.)

VALUE

Primary or Initiating Explosives
(Lead Styphnate, Lead Azide,
Nitroglycerin, Mercury Azide,
Mercury Fulminate, Tetracene, etc.) 10

Demolition Charges 10

Secondary Explosives
(PETN, Compositions A, B, C
Tetryl, TNT, RDX, HMX, HBX,
Black Powder, etc.) 8

Military Dynamite 6

Less Sensitive Explosives
(Ammonium Nitrate, Explosive D, etc.) 3

High Explosives (Select the largest single value) 10

What evidence do you have regarding bulk explosives? Lead Azide, demo-
lition charges, secondary explosives, and military dynamite have been
found, used, and/or stored at Ft. Devens.

D. Bulk Propellants (Not an integral part of rockets, guided missiles, or
other conventional ordnance; uncontainerized)

VALUE

Solid or Liquid Propellants 6

Propellants 0

What evidence do you have regarding bulk propellants? None of the
documents indicated that bulk propellants were used.

E. Chemical Warfare Materiel and Radiological Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, Tear)	5
Chemical and Radiological <u>(Select the largest single value)</u>	<u>25</u>

What evidence do you have regarding chemical/radiological OEW? All of the above items have been found, used, and or stored at Ft. Devens. Two mustard (or HD) filled stokes mortars have been found on (in a training room--per interview with Tom O'Donnell) and off (memorandum from Pine Bluff Arsenal dated 1 June 1994, Subject: Munitions Recovered Outside of Military Installations) of the installation. 11-Chemical Land Mines and 1-55 gallon drum were found March 1995.

=====
 Total Hazard Severity Value
(Sum of the Largest Values for A through E--Maximum of 61) 55
 Apply this value to Table 1 to determine Hazard Severity Category.

TABLE 1

HAZARD SEVERITY*

Description	Category	Hazard Severity Value
CATASTROPHIC	I	21 and greater
CRITICAL	II	10 to 20
MARGINAL	III	5 to 9
NEGLIGIBLE	IV	1 to 4
**NONE		0

* Apply Hazard Severity Category to Table 3

**If Hazard Severity Value is 0, you do not need to complete Part II. Proceed to Part III and use a RAC Score of 5 to determine your appropriate action.

Part II. Hazard Probability. The probability that a hazard has been or will be created due to the presence and other rated factors of unexploded ordnance or explosive materials on a formerly used DOD site.

AREA, EXTENT, ACCESSIBILITY OF OEW HAZARD
(Circle all values that apply)

A. Location of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations	4
Inside walls, ceilings, or other parts of Buildings and Structures	3
Subsurface	2
Location <u>(Select the single largest value)</u>	<u>5</u>

What evidence do you have regarding location of OEW? Several buildings are all over the installation. The ordnance items which have been found, have been subsurface, under water, and on the surface (surface items were found during the site inspection March 1995).

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, playgrounds, and buildings).

	VALUE
Less than 1250 feet	5
1250 feet to 0.5 miles	4
0.5 miles to 1.0 miles	3
1.0 miles to 2.0 miles	2
Over 2 miles	1
Distance <u>(Select the single largest value)</u>	<u>5</u>

What are the nearest inhabited structures? Ordnance could be anywhere on the site.

C. Numbers of buildings within a 2 mile radius measured from the OEW hazard area, not the installation boundary.

	VALUE
26 and over	5
16 to 25	4
11 to 15	3
6 to 10	2
1 to 5	1
0	0
Number of Buildings <u>(Select the single largest value)</u>	<u>5</u>

Narrative The area is mostly buildings.

D. Types of Buildings (within a 2 mile radius)

	VALUE
Educational, Child Care, Residential, Hospitals, Hotels, Commercial, Shopping Centers	5
Industrial, Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
No Buildings	0
Types of Buildings <u>(Select the largest single value)</u>	<u>5</u>

Describe types of buildings in the area. Residential, hospitals

E. Accessibility to site refers to access by humans to ordnance and explosive wastes. Use the following guidance:

BARRIER	VALUE
No barrier or security system	5
Barrier is incomplete (e.g. in disrepair or does not completely surround the site). Barrier is intended to deny egress from the site, as for a barbed wire fence for grazing.	4
A barrier, (any kind of fence in good repair) but no separate means to control entry. Barrier is intended to deny access to the site.	3
Security guard, but no barrier	2
Isolated site	1
A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility; or An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates, or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).	0
Accessibility <u>(Select the single largest value)</u>	<u>5</u>
Describe the site accessibility. _____	

F. Site Dynamics - This deals with site conditions that are subject to change in the future, but may be stable at the present. Examples would be excessive soil erosion by beaches or streams, increasing land development that could reduce distances from the site to inhabited areas or otherwise increase accessibility.

	VALUE
Expected	5
None Anticipated	0
Site Dynamics <u>(Select largest value)</u>	<u>5</u>

Describe the site dynamics. Ft. Devens is to be surplusd in the near future. Construction may take place.

=====

Total Hazard Probability Value
 (Sum of Largest Values for A through F--Maximum of 30) 30
 Apply this value to Hazard Probability Table 2 to determine
 Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY

Description	Level	Hazard Probability Value
FREQUENT	A	27 or greater
PROBABLE	B	21 to 26
OCCASIONAL	C	15 to 20
REMOTE	D	8 to 14
IMPROBABLE	E	less than 8

* Apply Hazard Probability Level to Table 3.

=====

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with the results of the hazard probability and hazard severity values.

TABLE 3

Probability Level		FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
Severity Category:						
CATASTROPHIC	I	1	1	2	3	4
CRITICAL	II	1	2	3	4	5
MARGINAL	III	2	3	4	4	5
NEGLIGIBLE	IV	3	4	4	5	5

RISK ASSESSMENT CODE (RAC)

- RAC 1 Expedite INPR, recommending further action by CEHND - Immediately call CEHND-ED-SY---commercial (205) 955-4968 or DSN 645-4968.
- RAC 2 High priority on completion of INPR - Recommend further action by CEHND.
- RAC 3 Complete INPR - Recommend further action by CEHND.
- RAC 4 Complete INPR - Recommend further action by CEHND.
- RAC 5 Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

=====
Part IV. Narrative. Summarize the documented evidence that supports this risk assessment. If no documented evidence was available, explain all the assumptions that you made.

Training on Fort Devens involved conventional ordnance as well as chemical munitions. Two H or HD filled stokes mortars and two FS filled stokes mortars have been found both on and off of the installation. Grenades have been found in Mirror Lake and in the Nashua River. Rockets have been found in housing areas on base. Three 3" Stokes Mortars, 11 Chemical Land Mines, and 1 55 gallon Type B Chemical Drum were found during the site inspection. The potential that additional ordnance may be found is high.
It is recommended that further action be conducted.

Appendix D

Safety Concepts and Basic Considerations for Unexploded Explosive Ordnance (UXO) Operations

U.S. ARMY CORPS OF ENGINEERS, HUNTSVILLE DIVISION
SAFETY CONCEPTS AND BASIC CONSIDERATIONS FOR
UNEXPLODED EXPLOSIVE ORDNANCE (UXO) OPERATIONS

INTRODUCTION

There is no "safe" procedure for dealing with UXO, merely procedures which are considered least dangerous. However, maximum safety in any UXO operation can be achieved through adherence to applicable safety precautions, a planned approach and intensive supervision. Only those personnel absolutely essential to the operation shall be allowed in the restricted area/exclusion zone during UXO activities (DoD 6055.9-STD). Safety must become a firmly established habit when working with UXO. Safety is the leading edge of quality.

1. GENERAL SAFETY CONCERNS.

a. Care must be observed in searching for, probing for, excavating, moving, and handling UXO. Operations on the UXO should be conducted only after the establishment of a complete plan for the operation involved and careful preparation to insure its implementation. Plans shall be based upon the minimum number of essential personnel, for a minimum amount of time, to the minimum amount of UXO consistent with efficient operations and maximum safety.

b. Only UXO qualified personnel shall be involved in UXO procedures. UXO procedures consist of gaining access (manual excavation) to subsurface UXO, identification, transportation, storage, and disposal of UXO. All personnel engaged in UXO operations shall be thoroughly trained in explosive safety and be capable of recognizing hazardous explosive exposures. Only personnel who have graduated from the US Naval EOD School, Indian Head, MD are authorized to handle UXO and perform UXO procedures. Hazardous Devices Technicians who have graduated from the Hazardous Devices School, Redstone Arsenal, AL are not trained nor qualified to handle military UXO and will not be involved in UXO operations on a CE project.

c. The use of electroexplosive devices (EED) susceptible to electromagnetic radiation (EMR) devices in the radio frequency (RF) range, that is, radio, radar, and television transmitters, has become almost universal. Radio frequency electromagnetic radiation consists of waves of electrical energy at radio transmission frequencies. These waves are radiated in a line-of-sight from the antennas of electronic devices that transmit radio, radar, television, or other communication or navigation radio frequency signals. The energy is usually equally radiated in all directions; however, certain types of antennas focus the energy, transmitting it in a single direction or sector only. EMR (RF) can also be reflected from large metallic surfaces or objects into areas not directly reached by the line-of-sight-radiated electric energy.

(1) Under highly undesirable conditions, enough of the energy may be picked up by portions of the EED, associated circuitry, or related objects acting as receiving antennas, to initiate the EED.

(2) Since the strength of the radiation decreases as the distance from the transmitter increases, the further away the ordnance item is, the less hazardous the situation. The energy can pass directly through materials that do not conduct electricity, such as wood or plastic. Therefore, using these materials as a barrier is of little value. The factors to be considered when evaluating the degree of hazard that the EMR (RF) energy represents are:

1) the strength of the field, that is, its power; 2) the nature of the frequencies transmitted; 3) the distance from the transmitter antenna to the ordnance, and; 4) the amount or type of protection available.

d. Some ordnance is particularly susceptible to EMR (RF) emission. This susceptibility is usually caused by the design of the ordnance item or the type of EED that is used. HERO categories have been established under which ordnance is classified as safe, susceptible, and unsafe. A knowledge of ordnance that is normally unsafe in the presence of EMR (RF) is important so that preventive steps can be taken if the ordnance is encountered in a suspected EMR (RF) field.

(1) In general, all ordnance items, even those normally safe when intact, are hazardous when extensively damaged. The damage may expose components, trailing wires, or breaks in shielding integrity that permit the entrance of EMR (RF) energy into the ordnance item and then into the EED.

(2) The presence of antennas, communication and radar devices should be a point of interest on initial site visits and preliminary assessments.

(3) The site shall be surveyed for electromagnetic radiation (EMR) radio frequency (RF) transmitters and appropriate action taken. Minimum safe distances between mobile RF transmitters, TV, and FM broadcasting transmitters and electric UXO demolition procedures are listed in Tables 2-3 and 2-4, TM 9-1375-213-12.

(4) Do not wear outer or undergarments made of wool, silk, or synthetic textiles such as rayon and nylon while working on UXO. These materials can generate sufficient static charge to ignite fuels or initiate explosives. Any person coming in contact with an UXO, shall ground himself prior to touching EEDs. This must be done to discharge any electrostatic charge accumulation from the body.

2. SITE CHARACTERIZATION

a. Make every effort to identify the UXO. Carefully examine the item for markings and other identifying features such as shape, size, and external fittings. However, do not move the item to inspect it. If an unknown UXO is encountered, photographs shall be taken and express-mailed to CEHND-ED-SY, which has access to the TM 60-Series publications.

b. Foreign UXO were returned to the United States for exploitation and disposal. Records search should indicate the possibility of foreign UXO being on the site.

c. If the records search indicates UXO containing military toxic chemical agents may be on the site, a decontamination plan shall be approved prior to entry onto the site. Any time a suspected chemical UXO is encountered, the 2-man concept is immediately implemented and notification shall be made through proper channels. The UXO shall be secured until the military arrives and assumes ownership.

d. UXO which penetrates the earth to a depth where the force of the explosion is not enough to rupture the earth's surface forms an underground cavity called a camouflet. Camouflets will be filled with the end product of the explosion, carbon monoxide gas. Camouflet detection and precautions must be considered if records search indicates the site was used as an impact area.

e. Avoid inhalation of, and skin contact with smoke, fumes, and vapors of explosives and related hazardous materials.

f. Consider UXO which has been exposed to fire and detonation as extremely hazardous. Chemical and physical changes may have occurred to the contents which render it much more sensitive than it was in its original state.

g. Do not rely on the color coding of UXO for positive identification of contents. Munitions having none, incomplete, or improper color coding have been encountered.

h. Avoid the area forward of the nose of a munition until it can be determined that the item is not a shaped charge and High Explosive Anti-tank (HEAT) UXO. The explosive jet can be fatal to great distances forward of the longitudinal axis of the item. Assume any shaped charge munition to contain a piezoelectric (PZ) fuze system until the fuze is otherwise identified. A PZ fuze is extremely sensitive, can fire at the slightest physical change, and may remain hazardous for an indefinite period of time.

i. Examine a projectile for the presence or absence of an unfired tracer.

j. Approach an unfired rocket motor from the side. Ignition will create a missile hazard and hot exhaust.

(1) Do not expose electrically fired rocket motors within 25-feet of any exposed electronic transmitting equipment or exposed antenna leads.

(2) If an unfired rocket motor must be transported, it shall be positioned in the direction which offers the least exposure to personnel in the event of the accidental ignition.

k. Consider an emplaced landmine armed until proven otherwise. It may not be possible to tell, or it may be intentionally rigged to deceive.

(1) Many training mines contain firing indicator charges capable of inflicting serious injury.

(2) Exercise care with wooden mines that have been buried for a long time. Because of soil conditions, the wood deteriorates and the slightest inadvertent pressure on top may initiate the fuze.

l. Assume a practice UXO contains a live charge until it can be determined otherwise. Expended pyrotechnic/practice devices may contain red/white phosphorus residue. Due to incomplete combustion, phosphorus may be present and reignite spontaneously if subjected to friction or if the crust is broken.

m. Do not approach a smoking white phosphorus (WP) UXO. Burning WP may detonate the burster or dispersal explosive charge at any time.

n. The detection and identification of suspect explosive materials shall be accomplished in accordance with Chapter 13, TM 9-1300-214, "Military Explosives".

3. ORDNANCE RELATED HTRW ACTIVITIES.

a. 29 CFR 1926.100(a) requires personnel to wear protective helmets in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock or burns. During field activities on ordnance projects, hardhats need not be worn unless a head injury threat is present.

b. Soil samples, test pit excavation, and/or monitoring well installation are sometimes conducted in areas where subsurface UXO may be found. These intrusive activities must be preceded by a magnetometer survey to assure the safety of the sampling crews.

c. Prior to the drilling rig coming on site, a magnetometer and a hand-held auger shall be utilized to assure the drilling spot is clear of subsurface UXO.

(1) After finding an area the magnetometer indicates is clear of detectable UXO, the hand-held auger should be used to start the drill hole. At not more than 2-foot depth, the hand-held auger shall be withdrawn and the magnetometer probe shall be lowered into the auger hole. This procedure will ensure small UXO items (20mm projectiles and grenades), undetectable from the surface, are now detectable. This procedure shall be repeated until the maximum depth of the hand-held auger.

(2) Borehole monitoring shall continue at 2-foot intervals until virgin soil is encountered.

4. RESTRICTED AREA/EXCLUSION OPERATIONS.

a. Do not allow unauthorized or unnecessary personnel to be present in the vicinity of UXO. During the timeframe that UXO procedures are being accomplished, only necessary UXO personnel shall be within the restricted area/exclusion zone. When non-UXO personnel enter the restricted area/exclusion zone, all UXO procedures will cease. Limit personnel exposure time. UXO operations will always be based upon minimum exposure consistent with efficient operations.

(1) Plan for, provide, and know the measures to be taken in the event of an accident.

(2) Provide a designated emergency vehicle in the area in case of an accident or other emergency.

(3) Coordination with the appropriate airspace representative shall be conducted and the appropriate notification procedures arranged.

b. Before any movement of an UXO, the fuze condition must be ascertained. If the condition is questionable, consider the fuze armed. The fuze is considered the most hazardous component of an UXO, regardless of type or condition.

(1) In general, the condition of a BD fuze in an unexploded projectile cannot be determined through examination of its external features. When there is evidence that the projectile has been fired, the BD fuze is considered to be in the armed condition.

(2) Arming wires and popout pins on unarmed fuzes should be secured by taping in place prior to movement.

(3) Perform any initial movement of an armed fuze remotely and avoid any unnecessary movement of an armed fuze.

c. Personnel working with explosives and explosive ordnance shall comply with the following:

- (1) Do not carry fire or spark-producing devices on-site.
- (2) Do not smoke, except in authorized areas.
- (3) Do not have fires for heating or cooking, except in authorized areas.
- (4) Do not conduct operations without approved Standing Operating Procedures (SOP) and proper supervision.
- (5) Do not become careless by reason of familiarity with ammunition.
- (6) Do not conduct explosive operations during electrical, sand, dust or snow storms.
- (7) Do not conduct explosive operations between sunset and dawn.

d. When multiple search teams are operating on a site, the teams shall not work immediately adjacent to each other. A safe separation distance shall be established between each search team. This distance shall be based on the type of UXO expected to be encountered, but the distance shall never be less than 50m.

e. Perform initial movement of an embedded projectile remotely. First movement of an embedded projectile may cause fuze functioning. During this remote operation, precautions shall be taken for a high-order detonation.

- (1) DO NOT dismantle, strip, or subject any UXO to unnecessary movement, except in response to a valid requirement.
- (2) Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on the UXO. Such action may arm, actuate, or function the UXO.
- (3) Do not subject a mechanical time fuze to any unnecessary movement.
- (4) Do not unscrew a fuze from a fuze well that does not contain a fuze cavity liner. High explosives may be on the threads.

f. Expanded pyrotechnic/practice devices may contain red/white phosphorus residue. Due to incomplete combustion, red and white phosphorus may be present and reignite spontaneously if subjected to friction or if the crust is broken.

g. Do not undertake the handling or disposal of liquid propellant fuels or oxidizers if not familiar with the characteristics of the material.

h. Civil War projectiles shall be treated as any other UXO, especially projectiles with uncut Bormann time fuses and projectiles with percussion fuses, brass in particular. These have generally provided a watertight seal, even if they have been in the ground over one-hundred years. No projectile

should be exposed to excess heat, the ignition point of black powder, used as a bursting charge in all Civil War projectiles is 457 degrees F. Under no circumstances should an attempt be made to drill a hole in a projectile, either through the fuse or the body of the projectile.

i. Extra care shall be taken when uncovering a buried UXO, if records search indicated WP munitions were fired or destroyed in the area. A buried WP munition may be damaged and when exposed to air, may start burning and detonate. An ample supply of water and mud shall be immediately available if excavation reveals a WP UXO. Appropriate protective equipment (leather gloves, face shield, and flame-retardant clothing) and first aid shall also be immediately available.

5. STORAGE.

a. UXOs, UXO-components, packing materials or empty boxes will not be stored in magazines containing explosives.

b. A fire plan for the storage of explosives shall be prepared and coordination with the nearby fire department shall be conducted.

6. EXCAVATION OPERATIONS.

a. The usual method for uncovering buried UXO is to excavate by hand. Hand excavation is the most reliable method for uncovering UXO, but unless the UXO is very near the surface, hand excavation exposes more people to the hazard of detonation for a longer period of time than any other method. Hand excavation will be accomplished only by UXO personnel.

b. Earth moving machinery (EMM) may be used to excavate for buried UXO, if the UXO is estimated to be deeper than 12 inches. EMM shall not be used to excavate within 12 inches of an UXO. When excavation gets within 12 inches of an UXO, hand excavation shall be used to uncover the UXO. EMM may be operated by non-UXO personnel, under the direct supervision of UXO personnel.

(1) If more than one EMM will be used on the same site, they will be separated by at least 100m during excavation,

(2) During excavation operations, only those personnel absolutely necessary for the operation shall be within the restricted area/exclusion zone.

(3) Excavation and trenching shall comply with the provisions of 29 CFR 1926 subpart P.

7. DISPOSAL OPERATIONS.

a. As a general rule, UXO will be detonated in place when the situation allows. All detonation-in-place should be conducted by electrical means to assure maximum control of the site, except in extreme sandy soil which creates a static electricity hazard. Non-electrical means can be used when the situation dictates.

(1) Do not allow one person to work alone in disposal operations. At least one person shall be available near the disposal site to give warning and assist in rescue activities in the event of an accident. Only UXO qualified personnel shall be involved in on-site disposal operations.

(2) Initiating explosives include lead azide, mercury fulminate, lead styphnate, and tetracene. They manifest extreme sensitivity to friction, heat, and impact. When involved in a fire, they can be expected to detonate without burning. In storage, initiating explosives shall be kept wet with water or water/alcohol mixture. Every effort shall be made to prevent the liquid from freezing; frozen explosives material will not be handled. Lead azide shall not be allowed contact with copper, zinc, or alloys containing any concentration of such metals because of the likely formation of other azides that are more sensitive than the original lead azide. Likewise, mercury fulminate shall not be allowed contact with aluminum, magnesium, zinc, brass or bronze.

(3) If loose, bulk explosives are to be disposed of by detonation, detonate only one kind of explosive in any one given shot.

(4) Exercise extreme care in handling and preparing high explosives for detonation. They are sensitive to detonation by heat, shock, and friction.

(5) Keep initiating explosives in a water-wet condition at all times until ready for final preparation for detonation. The sensitivity of these explosives is greatly increased when dry.

(6) Do not pack a bomb fuze well with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.

(7) Photoflash bombs must be handled with the same care as black powder, and with even greater care than explosive-loaded bombs.

(8) Some practice bombs do not contain any positive safety features. Positively identify and review all safety precautions prior to handling practice bombs.

(9) WP UXO shall not be detonated into the ground. The UXO shall be counter-charged on the bottom-center-line.

(10) Photoflash powder will react with moisture and generate hydrogen gas, and this reaction may generate sufficient heat or pressure to detonate the UXO. Do not look directly at photoflash UXO during detonation.

b. When disposing of high explosives by detonation, do not approach the disposal site for at least 30 minutes in the event of a misfire.

(1) Carry blasting caps in approved containers and keep them out of the direct rays of the sun.

(2) Do not handle, use, or remain near explosives during the approach or progress of an electrical storm. All persons should retire to place of safety.

(3) Do not use explosives or accessory equipment that are obviously deteriorated or damaged. They may detonate prematurely or fail completely.

(4) Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling. This will minimize injury should the item explode.

(5) Use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.

(6) Use electric blasting caps of the same manufacture, whenever possible, for each demolition shot involving more than one cap.

(7) Keep blasting caps in approved containers, located at least 25 feet from other explosives, until they are needed for priming.

(8) Do not bury blasting caps. Use detonating cord to position blasting caps above the ground. Buried blasting caps are subject to unobserved pressures and movement which could lead to premature firing or misfires.

(9) Test electric blasting caps for continuity at least 25 feet downwind from any explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be short-circuited by twisting the bare ends of the wires together. The wires will remain shunted until ready to connect to the firing circuit.

c. A post-search of the detonation site shall be conducted to assure a complete disposal was accomplished.

d. If the situation dictates, protective measures to reduce shock, blast, and fragmentation damage shall be taken. Army Technical Manual (TM) 5-855-1, Fundamentals of Protective Design for Conventional Weapons and associated software program "CONWEP" contains data on blast effects, groundshock, cratering, ejecta, and fragmentation.

(1) For non-fragmenting explosive materials, evacuation distance should be a minimum of 1250 feet.

(2) For fragmenting explosive materials, evacuation distance should be a minimum of 2500 feet. For bombs and projectiles with caliber 5-inch or greater, use a minimum evacuation distance of 4000 feet.

(3) Items with lugs and/or strongbacks and nose and/or tail plate sections should be oriented away from personnel locations.

e. Consideration shall be given to tamping the UXO to control fragments, if the situation warrants. Fragments shall be minimized not only to protect personnel but property such as buildings, trees, etc.

f. Open burning of explosives and smokeless powder or chemical decomposition of explosives shall not be accomplished without prior approval of the contracting officer.

(1) Do not inhale the smoke or fumes of burning pyrotechnic or incendiary materials. The fumes and dust from many of these materials are irritating and/or toxic if inhaled.

(2) Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.

(3) Bury incendiary-loaded munitions in sand when transporting them. This will smother any fire which should start until other corrective action can be taken.

(4) Anticipate a high-order detonation when burning pyrotechnics or incendiary-loaded UXO. Safety measures for personnel and property must be based on this possibility.

g. Inert UXO will not be disposed of or sold for scrap until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture and air to expand and burst sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to confined pressure.

8. TRANSPORTATION.

a. If UXO must be transported off-site for disposal, the provisions of 49 CFR 100-199, TM 9-1300-206, and state and local laws shall be followed.

b. When transporting a possible armed fuze, position the fuze in the most neutral orientation possible.

c. Do not transport a WP munition, unless it is immersed in water, mud or wet sand.

d. If loose pyrotechnic, tracer, flare, and similar mixtures are to be transported, they shall be placed in #10 mineral oil or equivalent to minimize fire and explosion hazard.

e. If an unfired rocket motor must be transported, it shall be positioned in the direction which offers the least exposure to personnel in the event of an accident ignition.

f. If base-ejection type projectiles must be transported to a disposal area or collection point, the base shall be oriented to the rear of the vehicle and the projectile secured, in the event the ejection charge functions in route.

g. If an OEW, with exposed hazardous filler (HE, etc), has to be moved to a disposal area, the item shall be placed in a heavy duty plastic bag to prevent migration of the hazardous filler. Padding should also be added to protect the exposed filler from heat, shock, and friction.

Appendix E

References

1. DoD 6055.9-STD, DoD Ammunition and Explosives Safety and Standards
2. AR 385-10, The Army Safety Program
3. AR 385-64, U.S. Army Explosives Safety Program (Draft)
4. AR 405-90, Disposal of Real Estate
5. Archives Search Report Conclusions, Recommendations and Findings for Fort Devens, Ayer, MA dtd February, 1995
6. CEHND 1105-3-14, Standing Operating Procedures for Developing Ordnance & Explosive Waste (OEW) Related Contracts

Appendix F

Acronyms

BRAC	Base Realignment and Closure
CEHND	U.S. Corps of Engineers, Huntsville Division
CWM	Chemical Warfare Material
DDESB	Department of Defense Explosives Safety Board
DOD	Department of the Army
DRMO	Defense Reutilization and Marketing Office
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
HFA	Human Factors Applications, Inc.
OE	Ordnance and Explosives
OEW	Ordnance and Explosive Waste
RAC	Risk Assessment Code
USATEU	U.S. Army Technical Escort Unit