CHAPTER 5

Site Characterization Activities

5-1. Introduction.

a. This chapter presents an overview of the site characterization activities involved with a RCWM response action. A RI/FS must be completed for all remedial actions and an EE/CA must be completed for all NTCRAs, as required by the NCP. The CW-DC is responsible for executing the site characterization phase for RCWM projects IAW CERCLA and the NCP.

b. The purpose of the site characterization is to identify the most appropriate response action to address RCWM risk at a project. The determination of the recommended response alternative occurs following the completion of a site characterization, risk assessment of RCWM hazards present at the site, and evaluation of potential response alternatives. The data generated to support the selection of a RCWM response alternative is presented in either a RI report for a remedial action or an EE/CA for a NTCRA. The components of the site characterization phase, as they relate to the RCWM response process, are explained in the following paragraphs.

5-2. Site Characterization Planning and Coordination. The site characterization planning and coordination process includes the preparation of the Statement of Work (SOW), independent government estimate (IGE), and schedule; completion of a site visit; preparation and approval of all required planning documentation; and fulfillment of the project management, regulatory, real estate, and public participation requirements.

a. Preparation of the SOW. The site-specific data gathered during the Preliminary Assessment (PA) and SI is used to prepare the SOW. The RCWM PDT will manage the preparation of the SOW and ensure that all applicable technical disciplines are appropriately involved. The PDT will include the customer(s), the PM, technical experts within or outside the local USACE activity, specialists, consultants/contractors, stakeholders, representatives from other Federal and state agencies, and vertical members from division and headquarters that are necessary to effectively develop and deliver the project. Additionally, the MM CX may be consulted to provide the appropriate statements concerning the background or authority for the task order's award.

b. Preparation of the IGE. The IGE for a site characterization will be prepared IAW the guidance provided in EP 1110-1-18.

c. Site Visit.

(1) Site Visit SOW. The site visit may be authorized as either a purchase order or as the first task of an incrementally funded contract.

(2) Purpose. The purpose of the site visit is to provide the contractor with the opportunity to gather pertinent information for use in preparing the Work Plan and other planning documents. The information collected from the site visit allows the contractor to gain a better understanding of the nature and extent of the RCWM hazard and verify the locations of the proposed areas of interest. This information, which is instrumental in planning the site characterization, includes:

(a) Site features, such as terrain, soil type, access, and amount of brush clearance required.

(b) Location of / coordination with nearest hospital.

(c) Location of / coordination with nearest fire station

(d) Coordination with local Emergency Management Agency.

(e) Coordination with local airport/Federal Aviation Administration representatives.

(f) Coordination with local police, sheriff, Federal Bureau of Investigation, and/or Military Intelligence Office to assess security.

(g) Fencing requirements for explosives storage magazines.

(h) Location for support zone, investigative-derived waste storage locations, and explosive storage magazines if applicable.

(i) Location of the IHF, if applicable.

(j) Logistical coordination for lodging, equipment and vehicle rental, office space, explosives dealers, etc.

(k) Coordination with Range Control, Defense Reutilization Management Office, Ammunition Supply Point, and Post Provost Marshal, if applicable.

(l) Coordination with TEU, air monitoring personnel, PMNSCM, and the District for support activities during field investigations, as applicable.

(m) Location of Geophysical Prove-Out (GPO).

(3) Site Visit Requirements. The following paragraphs present requirements that apply to the site visit:

(a) Prior to the site visit, the contractor will be provided with copies of the ASR and any other site-specific information for review.

(b) An ASSHP will be prepared and submitted to the MM CX prior to visiting the site. The ASSHP will be prepared using the format provided in EP 1110-1-18.

(c) Generally, no more than three contractor personnel are required to participate. One contractor participant must be the project manager. Other recommended contractor personnel include the project geophysicist or project engineer. If there is potential for MEC, a government or contractor UXO escort will also be required.

(d) Since the site visit will be non-intrusive and anomaly avoidance techniques will be implemented, site visit participants are not required to have Hazardous Waste Operations (HAZWOPER) training or medical monitoring.

(e) The District will coordinate with the property owner/operator prior to the site visit if a ROE is required.

(f) A site visit for a typical project should take no longer than five days, including travel time.

(g) United States Army Center for Explosives Safety (USATCES) personnel will normally be given the opportunity to attend a site visit early on during the response action to facilitate a better review of the CSS for DA Safety.

d. Preparation of Planning Documents. To ensure all members of the PDT agree on the approach and procedures used to investigate the potential RCWM or CWM hazard locations, a RCWM Conceptual Site Plan (CSP) will be developed prior to initiating the CSS

and Work Plan. A detailed outline is provided in Chapter 7. A CSS may be required prior to beginning intrusive work at the RCWM site (see Chapter 4). If a CSS is not required, a Work Plan and supporting plans will still be required to conduct field activities.

(1) Work Plan. A site-specific Work Plan is required for all site characterization activities. The Work Plan documents the methodology that will be used to complete the site characterization. Following the site visit, the Work Plan will be developed IAW the SOW. The contents of the Work Plan, including sub-plans, are discussed in Chapter 7.

(2) SSHP. The contractor will also prepare a SSHP IAW the guidance provided in Chapter 7 of this document. The SSHP is included as a part of the Work Plan IAW ER 385-1-95 and EM 385-1-1.

(3) Supporting Plans. If a CSS is required, the following supporting plans will be prepared IAW Chapter 7 of this document: TEU Assessment Plan, Environmental Media Sampling and Analysis Plan, Public Evacuation or Shelter-in-Place Plan, and PMNSCM Plans. If only agent-contaminated media is suspected, TEU and PMNSCM plans may not be required.

(4) Public Affairs, Real Estate and Regulatory Requirements. During the site characterization planning and coordination process, the District PM must ensure that all applicable public affairs, real estate, and regulatory requirements, as discussed in EP 1110-1-18 and EP 1110-3-8, have been satisfied. Additionally, the applicable safety and training requirements, as specified in Chapter 8 of this document must be fulfilled.

(5) Anomaly Review Board. The District PM may also consider the establishment of an Anomaly Review Board (ARB). An ARB is only used in exceptional circumstances. Information on ARB procedures is provided in EP 1110-1-18.

5-3. Site Characterization for RCWM Projects.

a. Overview.

(1) In general, RCWM sites are comprised of disposal pits and test trenches, and to a lesser extent, impact ranges. The purpose of a RCWM site characterization is to obtain surface and subsurface RCWM data to characterize the site and to generate recommendations for the proposed RCWM response action. This characterization will include any data from any RCWM that has been located and/or disposed of by EOD or local law enforcement.

Potential sources for this data include the ASR, EOD records, or local law enforcement records. The following types of data will be collected for the site:

(a) Type of CWM or CWM-related activities associated with the site.

(b) Locations of CWM or CWM-related activities, including locations of pits or trenches.

(c) Density of CWM munitions at impact areas.

(d) Penetration depth of CWM munitions at impact areas.

(2) The components of the site characterization phase include:

(a) Implementation of the sampling methodology.

(b) Geophysical Instrument Prove-Out.

(c) Area preparation.

(d) Field sampling.

b. Statistical Tools. During a site characterization, statistical tools may be used to collect site-specific data for impact areas. In many cases, this is not required due to the fact that suspect areas have already been identified as disposal/burial areas and sampling is biased to these locations. Contact the MM CX for additional detail on the following:

(1) UXO Calculator. The UXO Calculator is a statistical model for determining the potential amount of UXO in a sector. The UXO Calculator assumes homogeneous presence of MEC within an identified area. It is used to determine statistical confidence intervals for UXO density and to perform statistical tests concerning UXO densities.

(2) Other. Other statistical methods that are agreed to by stakeholders, documented and approved.

c. MEC Detection Instrument Testing.

(1) Before geophysical surveys can begin on a site, the proposed geophysical survey methods and techniques must be tested and evaluated. The results of the GPO will identify realistic capabilities and limitations of applying geophysics at a particular site and aid in

determining proper post-processing procedures for the geophysical data. Additionally, a GPO demonstration offers the client an opportunity to observe the contractor's methods and evaluate their ability to meet Data Quality Objectives and compliance with project requirements. A GPO must be constructed so that it is representative of the project and the specific buried munition items known or suspected to exist.

(2) The objectives for the GPO are concerned mainly with establishing and maintaining high levels of quality control throughout this phase of the response action. EM-1110-1-4009 provides a detailed list of general objectives for a GPO, including the GPO Plan and GPO Report. In addition, stakeholders and regulators for the project will be consulted before the objectives are finalized.

(3) The GPO is performed prior to initiation of the field investigation. Prior to the GPO, a GPO Plan and appropriate SSHP must be developed.

d. Area Preparation. Area preparation includes the identification and marking of geophysical sampling grids and the removal of sufficient vegetation and other obstacles that may restrict sampling efforts.

(1) Location Surveying and Mapping. Location surveying and mapping will be performed by the contractor to establish the boundaries of the areas under investigation. The procedures to be used in the execution of location surveying and mapping are discussed in EM 1110-1-4009.

(2) Brush Clearance.

(a) Prior to conducting any field sampling, brush clearance may be required. The purpose of brush clearance is to remove sufficient vegetative growth from the areas to be investigated in order to effectively locate, investigate, and remove subsurface anomalies.

(b) The vegetation removal techniques used must be coordinated with the District environmental staff and documented in the Work Plan. A UXO Technician II shall always escort the brush clearing crew in areas not previously cleared of MEC or munitions with unknown fillers. The safety requirements listed in EM 385-1-1 shall be followed. PPE will be provided to the brush clearance crew and used for protection as required. All brush clearance personnel must be trained in the safe operation of the necessary equipment and have obtained site-specific safety training IAW Chapter 8 of this document.

(3) Removal of Surface Debris. Surface debris removals are conducted to remove all MEC, RCWM, munitions debris, and other metallic debris from the surface of the area to be characterized that may interfere with the geophysical investigation. UXO-qualified personnel will flag, identify, and record the approximate location of all MEC, RCWM, or munitions with unknown fillers. TEU is responsible for assessing munitions with unknown fillers and then packaging and transporting those items to the IHF IAW the approved CSS. UXO-qualified personnel may assess, handle, and dispose of MEC items IAW the approved CSS. The contractor may handle and dispose of other items of surface debris, and will also assist the TEU as needed. The contractor will remove all chemical agent contaminated scrap and non-RCWM related materials that may interfere with the geophysical investigation. These items will be headspaced and decontaminated as necessary before being stored for later disposition.

e. Field Sampling. During the field sampling, surface and/or subsurface sampling is conducted to obtain the data necessary to conduct an accurate site characterization.

(1) Surface Sampling. In the event that RCWM or munitions with unknown fillers were encountered during the removal of surface debris, the contractor will perform environmental sampling IAW Chapter 9 of this document to verify that no residual chemical agent remains at those locations.

(2) Subsurface Sampling.

(a) Prior to the subsurface sampling effort, the contractor will perform a geophysical survey to locate subsurface anomalies. The procedures for conducting geophysical surveys are discussed in Chapter 6 of this document. Anomalies identified by the geophysical survey team will be intrusively investigated. Only TEU or approved UXO-qualified personnel will perform intrusive operations. RCWM response actions will proceed IAW the approved CSS.

(b) Once a munition with unknown filler has been exposed, TEU will assess, package, and transport the RCWM or munition with unknown filler to the IHF. The contractor will assist TEU as needed.

(c) If a munition with unknown filler is removed, then the excavated location will be rechecked with a magnetometer or other geophysical equipment. Upon completion of the recheck, if the location does not produce another anomaly or signs of additional burial (e.g., fill materials are no longer encountered), the excavated area will be sampled IAW Chapter 9 to determine if residual chemical agent is present. If the area is determined to be free of

agent, the area may be backfilled with clean soil. If chemical agent is present in the sample, then the on-site OE Safety Specialist will be notified.

(d) Evacuations are sometimes necessary when conducting intrusive investigations to minimize the risk of the operation. An EZ distance is calculated to ensure that all non-essential personnel are outside of that distance during the conduct of the excavation. The EZ distance may be reduced by implementing approved engineering controls.

(e) There are several other considerations, which must be accounted for during the intrusive investigation, including: engineering controls, EZ management, and quality assurance. These topics are discussed in detail in later chapters of this pamphlet.

5-4. Engineering and Operational Controls.

a. Engineering controls are used to improve personnel safety and/or to reduce the EZ during response operations. If an engineering control design is required to reduce an EZ due to fragmentation concerns, the Military Munitions Design Center (MM-DC) shall be contacted for design approval. Examples of engineering controls for vapor containment for RCWM activities include:

(1) The use of environmental structures to reduce or contain the agent should a release occur (e.g., an engineering control structure capable of vapor containment and blast mitigation). This is usually accompanied by the use of an approved air filtration system to capture the agent vapors.

(2) Filtered Shelter (other than the Vapor Containment Structure).

b. Operational Controls. Examples of operational controls for RCWM are described below.

(1) RCWM operations shall be performed during the hours of daylight.

(2) Certain temperatures can reduce the rate of release of agents. For example, mustard agent, or H, becomes a solid at temperatures below 57 degrees Fahrenheit. If the chemical agent of concern at the project was mustard agent, operations could be restricted to periods when the temperature would be below that temperature, thereby reducing the NOSE distance. However, even at temperatures below 57 degrees Fahrenheit, if the MCE is an explosively configured munition, containing H agent and the round functioned as designed, there would

be a hazard resulting from the release of agent caused by the heat generated from the explosion.

(3) Wind speed has a direct effect on downwind hazard distances. Normally the higher the wind speed, the more air turbulence exists, thereby reducing the downwind distance of the agent plume. Therefore, operations could be restricted unless the wind speed is at or above a certain level.

(4) Atmospheric stability. The time of day, the strength of sunlight (if any) in the area, the extent of cloud cover, and the wind velocity all play major roles in determining the level of turbulence in the atmosphere. Turbulence is the extent of "mixing" in the atmosphere. These factors determine downwind distances over which airborne contaminants will remain hazardous. Meteorologists typically divide atmospheric conditions into six atmospheric stability classes that generally range from "A" to "F". Class A represents unstable conditions under which there is strong sunlight, clear skies, and high turbulence in the atmosphere. These conditions promote rapid mixing and dispersal of airborne contaminants. At the other extreme, atmospheric stability Class F represents light steady winds, nighttime skies, and low level of turbulence in the atmosphere. Airborne contaminants mix and disperse much slower with air under these conditions.

(5) D2PC shall be used to calculate how temperature, wind speed, and atmospheric stability will affect the MCE-based hazard distances, such as the 1 Percent Lethality and NOSE distances. These calculations are performed during planning for the project to delineate EZs for the project, as well as during intrusive operations, where they are calculated regularly for specific weather conditions so that project personnel are prepared for an emergency in the event of a release and to determine whether planned EZs are adequate or overly conservative.

5-5. Environmental Sampling and Analysis. Soil samples will be obtained from locations, which could potentially have been contaminated with RCWM or decontamination products. Soil samples will be obtained at intervals justified in the approved Work Plan. Sampling and analysis may also be required for investigation-derived waste (IDW). Detailed information on environmental sampling and analysis is provided in Chapter 9 of this document.

5-6. Institutional Analysis.

a. Purpose. An institutional analysis is conducted to determine what opportunities exist to implement a land use control (LUC) program at a specific site. The institutional

analysis also identifies the existence of any local, state, Federal, or private agencies that may be available to assist in the implementation or maintenance of the LUC program. An institutional analysis is necessary in order to evaluate whether LUCs are viable at a particular site as a stand-alone response action or as a supplement to other response activities. LUCs are appropriate at virtually every site where RCWM is discovered. The institutional analysis will also aid in developing the most effective LUC program, if it is selected as the stand-alone response alternative, or as part of a more comprehensive remedial or removal alternative.

b. Determination of Existing LUCs. The existence of any current deed restrictions or other type of legal or administrative LUC that may have been placed on the property in the past as a result of some other activity shall be determined. If such restrictions are found to already exist at a site, it may be easier to modify the existing restriction to address the risk posed by RCWM than to implement an entirely new LUC.

c. For additional information on the application of LUCs for the munitions response process, refer to EP 1110-1-24.

5-7. Risk Characterization.

a. Purpose. A risk characterization is required as part of the response process. A risk characterization of a RCWM site is conducted to determine the level of safety risk that exists at a site as a result of the RCWM hazard. The risk characterization is a key component in determining the type of response necessary to address the safety risk and the basis on which subsequent cost-benefit analyses are conducted in the RI or EE/CA report.

b. Types of Risk Characterization Tools. Typically, a qualitative risk characterization tool is used for RCWM projects. For additional information on the selection of risk characterization tools, contact the MM CX.

5-8. Development and Evaluation of Response Action Alternatives.

a. Development of Response Action Alternatives. Once site-specific data has been gathered and analyzed, potential site-specific response action alternatives will be developed. A response action alternative may include physical removals, as well as any other alternatives that reduce risk to the public. The alternatives will be developed based on existing site conditions, historic use of the site, the existing or proposed land use, and the extent and depth of RCWM. Site-specific alternatives must ensure the most effective use of resources, while providing maximum return to the public.

b. Response Action Alternatives. The development of response action alternatives is described in detail in ER 200-3-1.

c. Evaluation of Response Action Alternatives. Once the cleanup objectives have been established for a site, the various response action alternatives developed in the RI or EE/CA report must be evaluated in terms of how well they will meet these objectives. Three general evaluation criteria are used to evaluate the proposed alternatives for both RI/FS and EE/CA. For RI/FS, the categories of evaluation criteria are threshold criteria, primary balancing criteria, and modifying criteria. For a NTCRA the categorie of evaluation criteria are effectiveness, implementability, and cost. The specific evaluation criteria and the evaluation process for both remedial and removal actions are described in detail in ER 200-3-1.

d. Comparative Analysis of Response Action Alternatives. Those alternatives that still appear feasible after the above evaluation are then compared to each other using the same criteria described above. During this comparative analysis, the alternatives are ranked and the recommended response action alternative is selected.

5-9. RI Report / EE/CA Report. The RI or EE/CA report documents the methodologies used during the site characterization and presents the findings of the alternatives evaluation. The RI or EE/CA report is a flexible document that is tailored to the scope, goals, and objectives of the response process. It should contain data to support the selection of a response alternative and future 5-year recurring reviews. Existing documentation should be relied on whenever possible.

a. The RI or EE/CA report for an RCWM response action is executed and approved by the CW-DC. The RI or EE/CA report is reviewed by the District and the MM CX.

b. ESS Requirement During the Site Characterization Process.

(1) A CSS may need to be prepared as part of the response action planning process, as discussed in Chapter 4 of this document. However, an ESS is prepared if the draft RI or EE/CA report recommends the response action alternative of either No DOD Action Indicated (NDAI) or LUCs. Examples of the content and format of an NDAI ESS and LUCs ESS are available in EP 385-1-95b.

(2) Both the NDAI ESS and LUCs ESS must receive concurrence from the USATCES and DDESB. Once the ESS has been approved, and all other comments on the draft RI or EE/CA report have been incorporated, the final RI or EE/CA report may be prepared.

5-10. RI or EE/CA Public Participation and Approval Process.

a. Once the RI or EE/CA report has been prepared and reviewed by the CW-DC, the MM CX, the District, and other stakeholders, the report becomes part of the Administrative Record for the site. The RI or EE/CA report is then made available for public review. The requirements for public participation are presented in ER 200-3-1 and additional information is in EP 1110-3-8.

b. If RCWM remains or is suspected to remain after completion of a response action, the property owner(s) will be apprised through the Administrative Record or other written agreements and all documentation will be annotated accordingly.

5-11. Action Memorandum/DD/ROD.

a. The Action Memorandum/DD/ROD are concise documents that identify the response action chosen for implementation at a site. The Action Memorandum or DD/ROD may also reserve the appropriate funding needed for the proposed response action. An Action Memorandum is required prior to implementation of TCRAs and NTCRAs. Requirements concerning the applicability of the Action Memorandum/DD/ROD, their format, and their review and approval process are laid out in ER 200-3-1 and additional information can be found in EP 1110-1-18.