COST-TO-COMPLETE GUIDANCE

GUIDELINES FOR DEVELOPING AUDITABLE COST-TO-COMPLETE ESTIMATES FOR THE U.S. ARMY ENVIRONMENTAL CLEANUP PROGRAMS

FINAL

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Acknowledgements

*Cost-to-Complete (CTC) Workgroup consists of representatives from the Office of the Assistant Chief of Staff for Installation Management, Director of Environmental Programs (ODEP) Installation Management Agency (IMA), National Guard Bureau (NGB), U.S. Army Environmental Command (USAEC), Base Realignment and Closure (BRAC) Office, and Army Materiel Command (AMC).

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TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

1 INTRODUCTION

1.1 In April 2003, the Assistant Secretary of the Army (Installations and Environment), ASA(I&E), directed that environmental restoration and compliance-related cleanup be addressed under a unified Army Environmental Cleanup Strategy (AECS). The AECS integrates the cleanup of the environment under the Defense Environmental Restoration Program (DERP) at active/operating Army installations, the Base Realignment and Closure (BRAC) program, the DERP for Formerly Used Defense Sites (FUDS), and Compliance-related Cleanup (CC). The purpose in directing this "one cleanup program" is to optimize program efficiency, accountability, and consistency by applying common objectives and requirements to all cleanups associated with past and current activities in support of installations and the transforming Army.

1.2 References, definitions, and acronyms can be found at Appendices 1, 2, and 3, respectively.

2 PURPOSE

2.1 This guidance was developed for Army personnel engaged in developing Cost-to-Complete (CTC) estimates. It is designed to help environmental managers in all cleanup program areas understand how to develop cost estimates that will assist in meeting financial management requirements consistent with potential audit procedures for the Army environmental cleanup program.

2.2 This document provides additional and new guidance on the criteria and standards for developing, preparing, reviewing, and reporting CTC estimates. This includes costs for the Installation Restoration Program (IRP) category and the Military Munitions Response Program (MMRP) category under the DERP, and the CC program at active, National Guard Bureau (NGB) and Reserve installations, installations deemed excess to Army needs (Excess Installations), closing and realigning installations under the BRAC program, and remediation at installations overseas. Although this CTC Guidance provides help for developing CTC estimates, it is not all-inclusive (see program-specific requirements).[1]

The FUDS program is managed by the U.S. Army Corps of Engineer (USACE). FUDS managers should refer to separate FUDS-specific guidance for developing CTC estimates.[2]

2.3 The common legal drivers for many of the cleanup requirements use terminology from federal environmental regulations, such as the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

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[1] Specific names, phone numbers, and e-mail addresses for CTC points of contact are included in the data call memo for each program.

[2] FUDS guidance is available at http://hq.environmental.usace.army.mil/programs/fuds/fuds.html.

2.4 Throughout this guidance, a State Army National Guard (ARNG) Office and the Army Reserve Regional Readiness Commands (RRCs) are considered equivalent to an "installation."

3 BACKGROUND

3.1 Environmental cost estimators prepare CTC estimates to identify all requirements and/or costs to complete environmental cleanup actions for a particular site on an installation. CTC estimates for Army environmental cleanup programs are used for several purposes, including supporting planning, programming, budgeting and execution; reporting environmental liabilities; track cost avoidance measures implemented by Army installations; and report future program funding requirements to Congress. In accordance with Public Law 101-576, "Chief Financial Officers Act of 1990," November 15, 1990, the Army requires that CTC estimates comply with financial management and accounting standards and that they be subject to a subsequent financial audit.

3.2 CTC estimates must comply with Department of Defense (DoD) Financial Management Regulation (FMR) 7000.14-R. This regulation requires CTC estimates to include adequate documentation of data sources, methods of estimation, and management review of CTC estimates.[3] The FMR stipulates that CTC estimates are subject to audit. Therefore, information used to develop CTC estimates for the Army environmental cleanup programs may be audited by the DoD Inspector General (DoDIG), the Army Audit Agency (AAA), or other outside audit agencies. (See Appendix 4 for requirements and Appendix 5 for additional information on reporting guidance.)

4 RESPONSIBILITIES

The responsibilities for preparing, reviewing, approving, and validating CTC estimates are summarized below. Table 1 provides a summary of responsibilities for developing cost-to-complete and financial liability estimates. Each organization is responsible for designating qualified personnel to perform the tasks in the following sections.

4.1 INSTALLATION

- Develop CTC estimates and assemble supporting documentation (whether the estimate is prepared in-house or by an external entity).
- Conduct and document the supervisory review, including a completed and signed Supervisory Review Checklist (see Appendix 6). For Excess Installations, see Section 4.5.

[3] FMR Vol. 4, Accounting Policy and Procedure.

4.2 INSTALLATION MANAGEMENT AGENCY (IMA) (INCLUDING RESERVES)

- Perform program management and approval of compliance-related cleanup requirements.
- Perform quality control (QC) review for compliance-related cleanup requirements.

4.3 NATIONAL GUARD BUREAU (NGB)

- Perform program management and approval of compliance-related cleanup requirements. Approve the Massachusetts Military Reservation compliance-related cleanup program requirements.
- Perform QC review for compliance-related cleanup requirements.

4.4 ARMY COMMANDS

- Perform program management, approval, and validation of compliance-related cleanup requirements.
- Perform QC review for compliance-related cleanup requirements.

4.5 U.S. ARMY ENVIRONMENTAL COMMAND (USAEC)

- Perform DERP program management and approval for DERP requirements at active, NGB, and Excess Installations.
- Perform QC review for the DERP at active, NGB, and Excess Installations.
- Perform quality assurance (QA) for all cleanup program estimates (DERP and compliance-related cleanup at active, NGB, Excess, and BRAC Installations).
- Conduct supervisory review QC and QA for specially designated cleanup programs where expenditures exceed $5 million per year. Currently, the compliance-related cleanup program at the Massachusetts Military Reservation is the army's only specially designated cleanup program.

4.6 ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT (ACSIM) BRAC DIVISION

- Perform program management and approval of compliance-related cleanup requirements at Excess Installations and DERP for BRAC installations.
- Conduct and document the supervisory review, including a completed and signed Supervisory Review Checklist (see Appendix 6), for all programs.

- Perform QC review for DERP and compliance-related cleanup requirements at BRAC and Excess Installations.

4.7 ACSIM OFFICE OF THE DIRECTOR OF ENVIRONMENTAL PROGRAMS (ODEP)

- Verify that all necessary program costs are identified in accordance with Army policy and guidance.

Table 1. Responsibilities for Developing Cost-to-Complete and Financial Liability Estimates

ACTIONS[b]	Army DERP Active/Excess Installations	BRAC	Massachusetts Military Rsvn Compliance-Related Cleanup (AEC/NGB)	Compliance-Related Cleanup (IMA CONUS and Overseas)	Compliance-Related Cleanup (NGB)	Compliance-Related Cleanup (Special Installations)	Compliance-Related Cleanup (USAR RRC/Installation)
CTC Estimates	Installation RPM (AEC for NGB and MMRP)	BRAC Environmental Coordinator	PM MMR	Estimator (Installation RPM or representative)	Estimator (Installation CC RPM or representative)	Estimator (Installation RPM or representative)	Estimator (Installation RPM or representative)
Reviewer	Estimator Peer or Supervisor	Estimator Peer or Supervisor	Estimator Peer or Supervisor	Estimator Peer or Supervisor	Estimator Peer or Supervisor	Estimator Peer or Supervisor	Estimator Peer or Supervisor
Supervisory Review	BRAC Division/Installation Environmental Chief	BRAC Division/Lead Organization (BRAC V)	USAEC Deputy to the Commander	Installation Environmental Chief	State Environmental Program Manager	Director of Public Works or Equivalent	Installation Environmental Chief
Quality Control	USAEC Cleanup Division	BRAC Division*	USAEC Cleanup Division	IMA Region Environmental Representative	NGB Environmental Program Division, Cleanup Branch representative	MSC or ARCOM Environmental Representative	IMA ARD Representative
Quality Assurance	USAEC Cleanup PM Branch	USAEC Cleanup PM Branch	USAEC Cleanup PM Branch	USAEC Cleanup PM Branch	USAEC Cleanup PM Branch	USAEC Cleanup PM Branch	USAEC Cleanup PM Branch
Approval	USAEC Program Manager	BRAC Division	NGB Environmental Program Division, Cleanup Branch Chief	IMA HQ Environmental Representative	NGB Environmental Program Division, Cleanup Branch Chief	ARCOM Environmental Chief	IMA HQ Environmental Representative
Validation	ODEP Cleanup Division Chief	BRAC Division/ ODEP	ODEP Cleanup Division Chief	ODEP Cleanup Division Chief	ODEP Cleanup Division Chief	ARCOM Environmental Chief/Acquisition Program Manager	ODEP Cleanup Division Chief

[a] Supersedes the matrix issued by ACSIM memorandum, DAIM-ZA, 18 Nov 04, subject: Improving the Reporting of Environmental Liabilities.
[b] **Cost-to-Complete Estimates**: Staff prepares site-level cost-to-complete estimates using RACER or engineered estimates. Estimates must be auditable. Data is entered into database of record [i.e. Army Environmental Database-Restoration (AEDB-R), Army Environmental Database-Compliance-related Cleanup (AEDB-CC)]. Estimate must be signed by estimator.
Reviewer: Individual other than the estimator who has knowledge of the site and estimating methodology, and is, at a minimum, on an equal level with the estimator. The reviewer may be at a higher level than the estimator, but in no case may the reviewer be at a level below the estimator. The reviewer signs the estimate to attest that the estimating methodology, facts, and assumptions are appropriate for the site cost estimate.
Supervisory Review: Management level review that attests that the estimate is accurate and complete and supported by appropriate documentation. Additionally, the supervisor reviews the estimate development process, estimator qualifications/training, etc. Supervisor of staff preparing CTC estimate must review the estimate and sign the Supervisory Review Checklist. Must be a government (federal or state) employee. Installation Environmental Chief/BRAC Division can delegate in writing the Supervisory Review for the MMRP to USAEC.
Quality Control: Reviews estimates for completeness. Checks if assumptions are valid. *This task may be delegated to USAEC, Cleanup Division.
Quality Assurance: Randomly selects certain estimates for thorough review. Checks to see if estimates are auditable.
Approval: Cleanup Program Managers have to approve estimates used for reporting their program's environmental liabilities.
Validation: ACSIM collects and validates environmental liabilities submitted by each cleanup program, checks to see if all necessary program aspects are identified and reported.

5 COST-TO-COMPLETE (CTC) ESTIMATES

5.1 SCOPE

5.1.1 The term "cost to complete" refers to the estimated cost for future cleanup of environmental contamination through site closeout. The maximum time span for projecting recurring costs is 30 years. If operations and/or long-term management (LTM) is ongoing at a site and is expected to continue beyond 30 years, estimates for continued operations or LTM must be projected for up to 30 years if required, during the annual update.

5.1.2 Army guidance on DERP and compliance-related cleanup requires that installations prepare CTC estimates for each eligible site in the program. This guidance is applicable to approved sites with underway or future phases in the Army Environmental Database—Compliance-related Cleanup (AEDB-CC) or Army Environmental Database—Restoration (AEDB-R). Section 5.7 assists environmental managers in producing CTC estimates.

5.1.3 CTC estimates shall not include the costs of day-to-day environmental compliance, pollution prevention, or conservation activities. Similarly, expenses associated with the operation, management, or sustainment of operational ranges are treated as current periodic expenses.

5.2 CTC ESTIMATOR TRAINING

5.2.1 Personnel [Army personnel, USACE staff, or private consultants] engaged in developing CTC estimates must have documented training and/or experience in the following areas:

- Army-approved environmental liabilities training or equivalent (see Appendix 7 for additional information on environmental liabilities). Refresher training is required every 2 years, and the schedule is available through Army Environmental Reporting Online (AERO) (see https://aero.apgea.army.mil/).
- The environmental program related to the type of estimate being developed (i.e., personnel must have experience in the environmental restoration field to develop cost estimates for environmental restoration activities).
- Technical aspects of the recommended cleanup approach for the site.
- Project planning and management.
- The cost estimating technique used. For example, estimates prepared using Remedial Action Cost Engineering and Requirements (RACER) should be developed by staff trained in the use of RACER.

5.2.2 The installation shall maintain documentation demonstrating the training/experience requirements as part of the CTC estimate file (see Section 5.5).

5.3 PREPARING AND UPDATING CTC ESTIMATES

5.3.1 Preparing CTC Estimates

5.3.1.1 Prepare CTC estimates that reflect the environmental cleanup strategy for the site.

5.3.1.2 Installations shall develop reasonable, probable, and measurable cost estimates through site close-out based on current site knowledge, and document all site-specific data and assumptions used to generate the cost estimate. Installations must document all assumptions in a memorandum for record (MFR). The estimator (Army staff or contractor) must sign the MFR. The reviewer who reviews the estimate must also sign the MFR. The reviewer ensures that estimating methodology, facts, and assumptions are appropriate for the site cost estimate and that the documentation supports the estimate.

5.3.1.3 The installation shall maintain detailed backup information to support all CTC estimates at the installation (even if external sources developed the estimates). The backup information must include, for example, estimated quantities, number of monitoring wells, frequency of sampling, and number of analyses, and be appropriately organized to support future audits.

5.3.1.4 CTC estimates shall include all reasonable anticipated costs through response complete (RC), long-term management (LTM), and site closeout, regardless of whether estimated costs extend beyond the current Program Objective Memorandum (POM) years. CTC estimates shall be reported on a current cost basis (i.e., as if all the costs were to be paid in the current fiscal year) and are **NOT** adjusted for inflation in the out years). CTC estimates shall **NOT** be based on the current availability of funds.

CTC estimates must:

- Be in U.S. dollars.
- Include the cost of complying with applicable legal, regulatory, and policy requirements.
- Be based on available information found in draft or final reports, work plans, etc., or documented assumptions.
- Be site-specific.
- Consider reasonably anticipated future land use of the site.
- Be based on current available technologies.

- Include the cost of completing all remaining studies and removal or remedial actions [including operation and maintenance (O&M) of remedial systems]. Recurring operations or long-term management must not be projected out beyond 30 years from the current estimate date.
- Include the following costs in the LTM phase (and any other costs during that phase, as appropriate):
    - All 5-year review costs where applicable,
    - Costs for management of Land Use Controls (LUCs) identified as part of a cleanup remedy at sites where remedies leave contamination in place,
    - Costs for replacement and upgrades to monitoring equipment,
    - Costs of decommissioning treatment systems and abandoning monitoring and extraction wells,
    - Costs associated with deletion from the National Priorities List (NPL), where appropriate,
    - Groundwater monitoring, and
    - All site closeout activities.

5.3.1.5 If the cost estimating model does not consider currency differences, then conversions from foreign currency to U.S. dollars must be addressed in the summary document/MFR.

5.3.1.6 CTC estimates shall include all ***project management*** costs for executing the action (i.e., USACE oversight costs) associated with the environmental cleanup of the site. Salaries for installation staff and contractors who serve as installation staff are ***program management*** costs and are **NOT** included in the site project costs. Program management costs are captured separately (see program-specific guidance for further information on program management costs).

5.3.1.7 CTC estimates are reported as specific dollar amounts for each phase.

5.3.2 Five Scenarios for Generating CTC Estimates (Corresponding to Examples in Appendix 8).

5.3.2.1 Estimates using RACER. Installations should use RACER to develop CTC estimates for DERP or CC sites without a Feasibility Study (FS), Corrective Measures Study (CMS), Engineering Evaluation/Cost Analysis (EE/CA), or other document which outlines the course of action. Other cost estimating methods may be used when the RACER software is not appropriate or does not support development of an estimate, or a contractor proposal for the site is available.

Guidelines for RACER CTC Estimates

Cost estimators must prepare their RACER estimates in accordance with Army-specific requirements to ensure successful import to the Army database of record. An MFR is used to document assumptions and the required information specified in section 5.4.1 of this guidance.

The Army guidelines for developing RACER estimates are:

- **Site ID and Site Name**. Site ID and Site Name should be the same as what is in the database of record. This will prove useful when importing the estimate into the database of record.
- **Do NOT use the Site Close-out phase.** Site Close-Out is not a separate phase in the Army data reporting systems. All technologies in the Site Close-out phase are available in the other phases.
- **Do NOT use User-Defined Technologies**. User-defined technologies are not accepted in the AEDB-CC and AEDB-R information management systems.
- **Do NOT use User-Defined Assemblies**. User-defined assemblies are not accepted in the AEDB-CC and AEDB-R information management systems. This does not apply to modifying quantities in the assemblies (note: all changes to assemblies must be documented).
- **Document any changes to RACER assemblies**. Changes made to RACER defaults in the assemblies (e.g., quantities) must be documented in the MFR.
- **Use System Analytical Templates only. Do not use Army analytical templates.** When developing estimates that require an analytical template, **use System Templates only.** Note: Army analytical templates are no longer updated annually.
- **Use Site Phase Templates.** Selecting the Template Method for setting up the site and phases is recommended.
- **Use Un-inflated Values only.** Do not escalate values across fiscal years (future requirements are stated in current year costs). Again, **do not select "escalated**."
- **Use the comment field.** Document the detailed assumptions used to generate the estimate (e.g., quantities) in the comment field. Identify the major cost drivers for the estimate. For example, if using excavation and load-and-haul for soil removal, identify the volume (yd^3) and dump charge per unit volume.
- **It is very important that RACER estimates be consistent with the database of record phase schedules in the data reporting systems.** Estimates should only include costs for phases with a status of underway or future in the database of record. If the estimator has an additional cost for phases that are not underway or

future in the database of record, the estimator should update the phase schedules in the database of record to allow for the inclusion of the additional cost. The database of record will only accept imported costs for phases that are underway or future. Check the phase schedule first if problems are encountered importing a RACER estimate into the database of record.

- **Generating a RACER estimate for import to the database of record.** The Army Interface Utility (AIU) will generate a ".csv" file for importing the cost estimate data into the database of record. This file provides marked-up costs only. The AIU is found in the RACER utilities menu under Agency Post Processors.

- **Importing the RACER estimate.** In the database of record, select RACER as the estimating source on the Funding Information/Cost Estimate and Requirements/Cost Estimate Detail Sheet screen. Select the link to import the RACER .csv file. This is the only purpose for the .csv file. ***Do not upload this file as supporting documentation.***

- **Generating the MFR.** Ensure that the information items outlined in paragraph 5.4.1 of this guidance are captured in the description and/or comment fields at each level (site, phase, and technology). Reference the supporting documentation for these assumptions [e.g., site investigation (SI) or remedial investigation (RI)] in the site description field. The estimator and reviewer each must sign and date the MFR. Upload the RACER .mdb file into the database of record to complete the estimate documentation. Two options are available for the MFR.

    - Option 1. **Manually produced (i.e., non-RACER) MFR**. Document the assumptions and basis for the estimate in a separate document [e.g., Microsoft Word for Windows (MS Word), Adobe Acrobat .pdf file]. See the example 1 in Appendix 8.

    - Option 2. **RACER-generated MFR**. Ensure that the assumptions and basis for the estimate are documented in the description/comment fields in RACER. Generate the Folder Cost Summary Report for a ***site*** from RACER as follows:

        1. Select the installation for which the report is being generated.
        2. Select "Reports" in the menu bar at the top of the screen.
        3. Select "Cost Summary" under "Folder Reports" and then click on "Run Report."
        4. Select the project name then click on "Accept."
        5. Select the site then click on "Accept." ***Run each site individually and not multiple sites at the installation.***
        6. Under "choose the print options for the report":

a. Check “Type” under Phase Sorting.

b. Check “Show assemblies” under Technologies.

c. Under “Other,” check descriptions, comments, and tab notes, then click on “Print.”

For either option for preparing the MFR, the preparer and reviewer must sign and date the MFR. Provide a printed name and telephone number for each person. Scan the signed and dated MFR for uploading to the database of record. Both the ***MFR AND the RACER*** .mdb file serve as supporting documentation for auditability.

- **Generating the database file for upload to the database of record.** A .mdb file must be exported for upload to the database of record. Instructions for creating the database export are presented in Appendix 9.

Installations may use RACER and other cost estimating sources to develop CTC estimates for different phases at a single site (e.g., using RACER to estimate the CTC beyond the investigative phase, and using a contractor cost proposal for the RI phase). These estimates are considered “OTHER” and must be manually entered into the database of record. See Appendix 8, Example 4b for a sample MFR when the cost estimate is generated using multiple sources. ***Note: If a cost proposal or contract is available for a specific phase, that estimate must be used in the database of record for that phase, not RACER.***

5.3.2.2 Site Documentation Estimate. If a Feasibility Study, Corrective Measures Study, Decision Document (DD), Record of Decision (ROD), or Engineering Evaluation/Cost Analysis is generated, the recommended alternative or selected remedy must be used to generate the estimate beyond the investigative phase. Regardless of the estimate source selected, the estimator must be able to show an audit trail from the site documentation to the CTC estimate in the MFR. The supporting documentation must also be maintained in the CTC estimate file.

Installations must adjust prior year costs to current fiscal year dollars where required. The escalation factors will be posted on AERO. Out year costs must be reported in current year dollars and must NOT be escalated.

5.3.2.3 Actual Costs. Installations must use actual cost data at sites where remedial operations or LTM has occurred for more than 2 years, unless a contractor cost proposal is more accurate. Historical costs and updates to previous year estimates must be adjusted to current year dollars using escalation factors posted on AERO (see Appendix 10 for an example). Out year costs must be reported in current year dollars and must NOT be escalated.

Documentation to support recurring actions may be invoices, purchase orders, existing contracts, and/or vouchers. Installations must maintain the supporting documentation in the CTC estimate file. Complete site documents must be available in the event of an audit.

5.3.2.4 Other Sources. Some cost estimates cannot be developed using a computer model because some cleanups are truly site-specific and unique to a particular set of contaminants or circumstances for which no computer model may exist. In that circumstance, the estimates must be developed based on engineering studies. Installations must support these estimates through contracts, studies, an Independent Government Cost Estimate (IGCE), or actual costs incurred on similar completed sites (see Example 4 in Appendix 8).

5.3.2.5 Multi-year fixed-price contracts with unfunded options. The contract is negotiated for all line items, but the basic contract may only be funded for a limited number of activities. Future activities are options that may or may not be exercised in subsequent years. Installations should list options as future requirements in the database of record based on the planned execution strategy. The out year requirements must **NOT** be escalated, because they are a fixed, negotiated cost. An MFR is still required to outline the contract execution strategy.

5.3.3 Updating CTC Estimates

5.3.3.1 Annual review and update. Installations shall review CTC estimates at least annually and update them as required based on current project information and schedules. Installations must update the CTC estimates to current fiscal year dollars. The escalation factors for continental United States (CONUS) installations will be posted on AERO. Out year costs must be reported in current year dollars and must NOT be escalated (see Appendix 10 for an example). Overseas installations must contact Resource Management personnel for country-specific escalation and currency conversion factors.

5.3.3.2 Material change. When the estimator prepares the CTC estimate for a site in a current year, the estimator must compare this current estimate with the estimate for the previous year to determine if there is a material change in the cost. A material change is defined as a 10 percent difference in cost, whether positive or negative, between the costs for a current year compared with previous year costs. If there is a material change, the estimator must document the reason for the material change (e.g., completed work, new regulatory requirements, additional discoveries) in the database of record. A 10 percent material change is automatically generated by the database. The estimator must provide an explanation for the change.

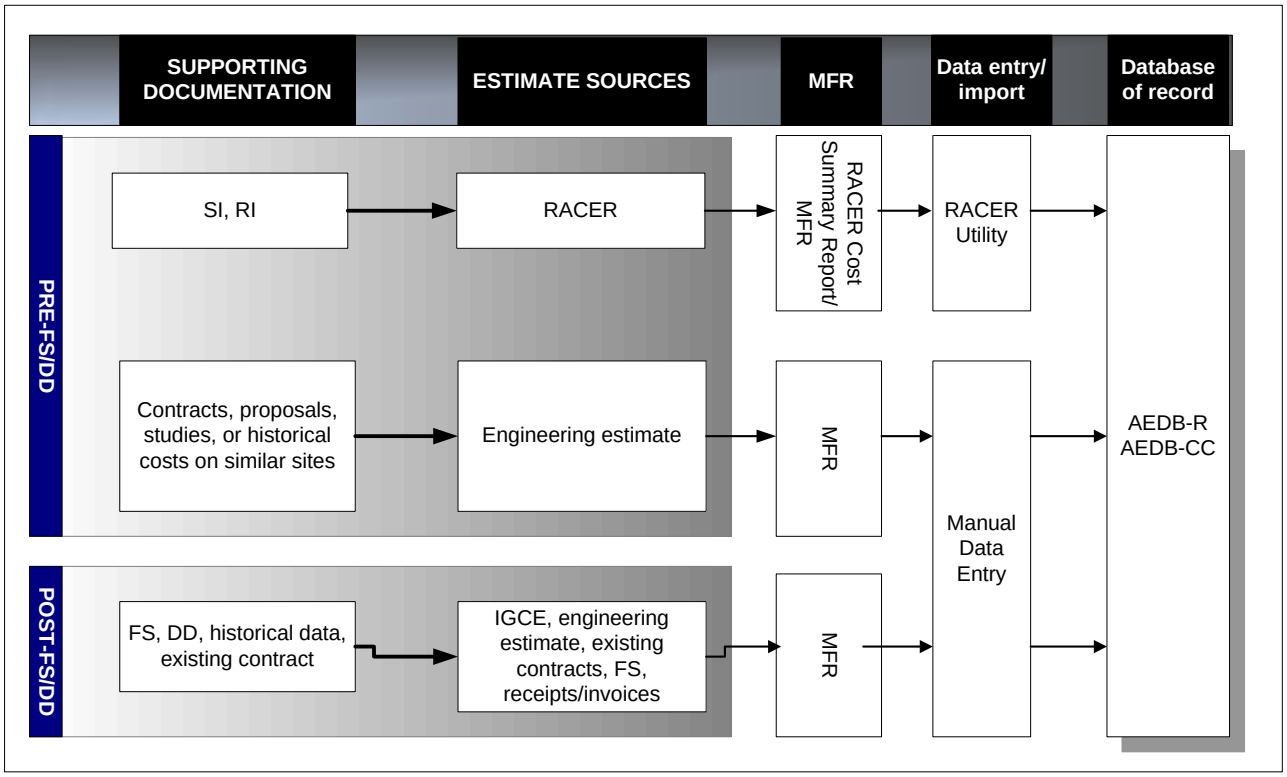
5.3.3.3 Installations will need to update RACER estimates using the current version of RACER. RACER estimates from the older versions must be imported or upgraded into the new version of RACER and re-run to bring the estimate to current year dollars.[4]

Installations must update and document material changes and adjustments for current costs in an MFR.

[4] Contact the RACER Technical Support Line (303) 771-3103 for assistance in importing previous version RACER estimates into the current version.

Figure 5-1 provides an overview of supporting documentation required for the different estimate sources and the data entry method for the database of record.[5]

Figure 5-1. CTC Data Flow into AEDB-R/AEDB-CC



5.4 REQUIRED DOCUMENTATION

The FMR emphasizes that financial records, including CTC estimates, must have audit trails to allow transactions to be traced from the point of initiation to the final report. A fundamental requirement of a good audit trail is that all transactions must be adequately supported with pertinent documents and source records.

Sections 5.4.1 through 5.4.3 identify the files that installations must upload to the database of record. These files must be provided in Adobe Acrobat (.pdf) or a Microsoft Office Suite format.

[5] The figure uses Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documents as a reference point; similar documents can also be used.

5.4.1 Summary Document/MFR

Estimators must develop a summary document/MFR to upload to the database of record, and place in the installation's project files. **The MFR must be signed and dated by the estimator *and* the reviewer (two signatures).**[6] It must identify the assumptions and supporting documentation used, and the information from the documentation used as the basis for the estimate. When using the RACER Cost Summary Report as the MFR, supporting documentation (e.g., SI or RI) must be referenced in the appropriate description/comment fields. An example of an MFR is included in Appendix 8.

The following items must be included in the MFR:

- **Background Information:** The background information must contain data/facts needed to identify the conditions surrounding the project.
- **Disposal or Restoration/Cleanup Strategy:** Document all the activities required for disposal of a specific material or to complete restoration/cleanup activities at a specific site.
- **Assumptions:** Information that was unknown at the time of estimate development but that the installation needed to complete the estimate. For example, "We have assumed that 300 samples need to be collected based on volume of contamination, media, and type and frequency of samples to meet the documented regulatory agency requirement."
- **Calculation Summary:** A summary of how the estimate was calculated. This calculation summary identifies what information the installation used from the supporting documentation (see Appendix 8 for an example).
- **Quantities:** The amount needed of a particular physical aspect/unit.
- **Cost per Unit:** Cost to purchase a particular physical aspect/unit (i.e., unit costs for major cost drivers such as disposal cost per cubic yard).
- **Cost Elements:** The components of a particular cost/estimate. For example, utilities are an element of the overall operations and maintenance costs. Cost elements also include escalation or conversion factors for expressing estimates in current year dollars.
- **Material Changes:** Any changes to the project or estimate that increase or decrease costs by 10 percent or more of the previous estimate must be identified and justified.

[6] The reviewer is someone who is familiar with the site at the installation level.

Therefore, installations must prepare documentation, as necessary, during the estimate development process and maintain copies of these documents in the CTC estimate file at the installation for each site (see Section 5.5).

Instructions for importing estimates and uploading supporting documentation into the database of record are found in the applicable cleanup program guidance and database of record user guide.

5.4.2 Supporting Documentation

Supporting documentation includes backup documents containing information used as the basis of the estimate. Include only the report cover page and specific pages with the pertinent information circled (e.g., recommended alternative or selected remedy, quantities, unit costs, total costs). In addition, include manual calculations on the page as appropriate. Do not upload entire documents unless all pages of the hard copy document are required to support the estimate. Supporting documentation must match what is uploaded in the database of record. In the event of an audit, the complete document must be available. Additional examples are included in Appendix 8.

Examples of supporting documentation include:

- Draft or final investigation reports, sampling plans, work plans (SI or RI),
- Feasibility Study or Corrective Measures Study,
- Independent government cost estimate,
- Contracts or contractor proposals, and
- Historical costs.

5.4.3 Supervisory Review Checklist

Installations must use the Supervisory Review Checklist to document supervisory review and final approval of the CTC estimates. Installations must upload the most recent version of the Supervisory Review Checklist to the database of record (see Section 5.8 describing the supervisory review and Appendix 6 for a recommended checklist).

5.5 CTC ESTIMATE FILES

Army DERP and CC guidance requires supporting documentation to be maintained at the point of origin (usually the installation) as part of the audit trail for the annual financial statement. Installations should maintain the individual site CTC estimate and supporting documentation in the project file. The project file is **NOT the database of record**. A separate file for each site must be available and easily accessible at the point of origin.

Project files will be maintained in accordance with AR 25-400-2, Army Records Information Management System.

5.5.1 Summary Document/Memorandum for Record (see Section 5.4.1)

A hard copy of the current MFR must be kept in the estimate file. This MFR must match what is uploaded in the database of record.

5.5.2 Supporting Documentation (see Section 5.4.2)

The supporting documentation must include all available records, as well as what is uploaded in the database of record.

5.5.3 Supervisory Review Checklist (see Section 5.4.3)

A hard copy of the current Supervisory Review Checklist must be kept in the estimate file. This Supervisory Review Checklist must match what is uploaded in the database of record.

5.5.4 Training and Experience Records (see Section 5.2)

Installations are required to maintain estimator training/experience records.

5.6 CLARIFICATION FOR SPECIFIC PHASES

5.6.1 Introduction

5.6.1.1 Questions frequently arise about the costs associated with certain phases and aspects of the cleanup program. This section provides clarification to address frequently asked questions. In general, actions to address environmental contamination are "response actions." Different laws and regulations use different terms for actions. Although this section uses terminology from Federal environmental regulations (e.g., RCRA, CERCLA), actions under different laws (including state substantive requirements, DoD Instruction, etc.) will follow a similar pathway to completion.

5.6.1.2 CTC estimates are developed for sites with confirmed contamination. CTC determinations can begin at any phase beyond a RCRA Facility Assessment (RFA)/Preliminary Assessment (PA) phase. CTC is calculated by totaling the cost estimates for all remaining phases of a cleanup project.

5.6.1.3 For reporting purposes, the Army considers the RFA/PA at all environmental cleanup sites to be complete. CTC estimates must not include any costs associated with the RFA/PA phase. This phase must be entered as complete in the database of record.

5.6.2 Interim Remedial/Removal Action (IRA)

5.6.2.1 An IRA includes all required costs associated with the design and construction of any remedial/removal action when the investigation phase [RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS), Investigation (INV)/Corrective Action Plan (CAP), RI/FS] is underway and an immediate threat to human health and/or the environment exists. CTC estimates for this phase must also include all costs associated with an IRA before and after it is installed, up to the selection of the final remedy. These costs can include, but are not limited to:

- Design of the IRA treatment systems,
- Ongoing expenses to operate and maintain in-place IRA treatment systems,
- Performance-monitoring expenses associated with continuing IRA treatment systems (i.e., operational monitoring to ensure that system performance is optimized), and
- Monitoring expenses associated with meeting interim remedial action goals.

IRA operational and monitoring costs remain associated with the IRA unless/until the IRA becomes part of the final remedy, in which case the remaining/continuous costs are transferred over to and included in the operations phase.

5.6.3 Corrective Measures Implementation Construction (CMI-C)/Remedial Action Construction (RA-C)

When construction of the remedial system is completed and fully operational (i.e., after system startup), the CMI-C/RA-C phase is considered complete. Ongoing operational costs are captured in the subsequent operations phase. Ongoing monitoring and maintenance required as part of the selected remedy is included in this phase.

5.6.4 Corrective Measures Implementation-Operation (CMI-O)/Remedial Action Operation (RA-O)

5.6.4.1 Operation includes actual costs for activities required to maintain and operate a final remedy constructed at a site where cleanup goals have not yet been reached. This phase includes costs that are essential for the continued operation of the system, without which the system would stop functioning as designed. Monitoring and maintenance activities can be included in the operation phase until response complete (RC) status is reached. Operating costs (recurring costs) for CTC estimates shall not be projected beyond 30 years from the current estimate.

5.6.4.2 Monitored Natural Attenuation is considered operations until the documented cleanup goals are achieved (i.e., RC).

5.6.4.3 Operation requirements should be based on the remedial technology that is being implemented.

5.6.5 Long-Term Management (LTM)

5.6.5.1 The term "Long-Term Management" applies to activities or costs at a site that has achieved the documented cleanup goals (i.e., RC). Monitoring after Remedy in Place (RIP) occurs is part of operations. LTM includes costs for monitoring or reviewing site conditions and/or maintaining remedial actions to ensure continued protection as designed. LTM (recurring costs) for CTC estimates shall not be projected beyond 30 years from the date of the current estimate (inclusive of operations and LTM). Examples of LTM activities include, where applicable:

- Monitoring in support of completed final remedial action (this task may include monitoring well installation, maintenance, and abandonment.);
- Remedial Action 5-Year Review, where applicable;
- Land Use Control (LUC) implementation actions; and
- Site close-out costs.

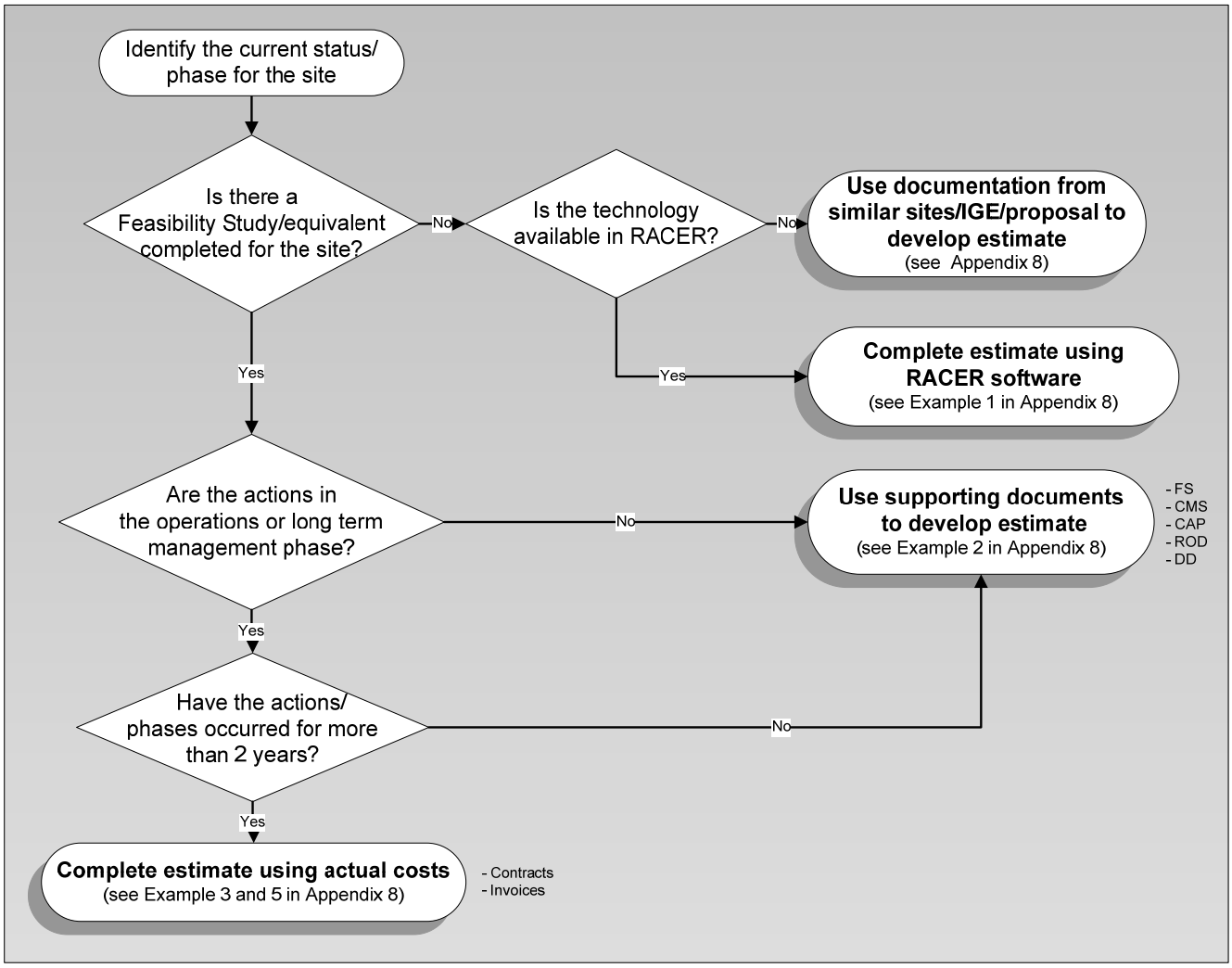
5.6.5.2 The Army can conduct the type of activities defined above in Section 5.6.5.1 at any time. When these actions are conducted after the cleanup goals are achieved (i.e., RC), they are LTM. Prior to achieving RC, these costs must be incorporated into the latest phase that is underway. For example, if monitoring and/or maintenance costs are required with the operations phase, they must be included in the operations phase.

5.7 DEVELOPING AUDITABLE CTC ESTIMATES

In preparing CTC estimates, installations should use the following summary of details and constraints to complete cost estimates within appropriate standards. Figure 5-2 provides a series of questions that guide the estimator toward the estimate source to be used.[7]

[7] CERCLA documents are provided as primary examples; similar documents can also be used.

Figure 5-2. Determining Estimate Source for Developing Cost Estimate



Prior to developing CTC estimates, the cost estimator must be aware of the project cleanup phase and status, and the database of record. The first question to ask is:

- Is there a Feasibility Study, Corrective Measures Study, Corrective Action Plan, Record of Decision, or Decision Document or equivalent completed for the site, regardless of version (i.e., draft, draft final, etc.)?

If the answer is "No," the installation must complete the estimate using the RACER software (see Scenario 1 in Appendix 8). *Exception:* If the proposed technology does not exist in RACER or site-unique characteristics are not available within RACER, cost estimates may be developed based on documentation for similar sites or engineering studies, an independent government estimate (IGE), or a contractor cost proposal rather than computer models. These estimates must be supported by contracts, studies, or actual costs for similar sites already completed (see Scenario 4 in Appendix 8).

If the answer is "Yes," use source documents (FS, CMS, CAP, ROD, DD) to develop the estimate (see Scenario 2 in Appendix 8). However, before proceeding, the installation must ask additional questions:

- Are the actions in the operations or LTM phase, and if so have they occurred for more than 2 years?

If the answer to both parts is "Yes," complete the estimate using actual costs (see Scenarios 3 and 5 in Appendix 8). Otherwise the cost estimator may use source documents to develop the estimate (see Scenario 2 in Appendix 8).

5.8 SUPERVISORY REVIEW

5.8.1 A relevant aspect of an internal control is that appropriate levels of authority must review and approve the accounting estimates. In addition to the technical review conducted by a peer or other technically knowledgeable individual, a supervisor must conduct a review of the estimates. The installation documents final approval in the Supervisory Review Checklist (see a recommended checklist in Appendix 6). The checklist should be completed and signed to reflect final approval, and maintained with the estimate as part of the audit trail. Installations must upload a signed Supervisory Review Checklist electronically to the Army database of record and update it at least annually or when changes occur.

5.8.2 An individual or panel can conduct the supervisory review of the estimates. The person who developed the estimate cannot sign the Supervisory Review Checklist. The supervisor must, at a minimum:

- Have familiarity with the project being reviewed, and
- Be a government employee and within the installation's chain of command (see responsibilities matrix in Table 1).

5.8.3 Supervisors must, at a minimum, base their reviews on the following questions:

- Are sound estimating methodologies and reasonable assumptions used?
- Did the estimator compare prior year estimates to the current year estimates and address unresolved comments from the previous data call QC review?
- Does the estimate include all relevant phases and costs to complete the cleanup?
- Is the estimate consistent with the operational plans of the installation? (CTC estimates can be developed based upon a future land use documented in the installation master plan.)

- Does the estimator have the proper qualifications and required training to develop the estimate as specified in Section 5.2 of this guidance? Are these qualifications documented in the estimate file (see Section 5.5.4 of this guidance)?
- Is there an adequate audit trail to support the estimate (see Section 5.4 of this guidance)? Are these documents maintained in the estimate file (see Section 5.5 of this guidance)?
- Is there adequate documentation to support the underlying assumptions used to develop the estimate (see Section 5.4 of this guidance)?
- Does the supervisor agree with the underlying assumptions used to develop the estimate?
- Is the estimate maintained in the current cost basis?
- Is this estimate previously recorded in another database?

5.9 QUALITY CONTROL (QC) REVIEW

Program Managers, as defined in the AECS, will designate individuals to conduct the QC review. These individuals will perform an independent review of all data including supporting documentation and CTC estimates entered in the database of record. Accuracy and completeness are critical elements in all CTC estimates. Program Managers are committed to ensuring the reliability and completeness of the data used to calculate the CTC estimates that support the Army's environmental financial liabilities.

5.9.1 Scope

The QC review consists of verifying that the proposed strategy for the site is reasonable, and that the documentation supports the estimate and is complete. The results and resolutions of the review will be documented and maintained for audit review.

5.9.2 Quality Control Procedures

Each cleanup program will develop its own QC plan that, at a minimum, must address the following:

- Was the proper estimating method used?
- Is the estimate complete? Are the assumptions valid?
- Is the documentation complete, and does it support the estimate?

- Did the installation adequately document the nature of the change for sites with "material changes" or "zero cost estimates"?
- Is the selected remedy appropriate?

Program managers will conduct QC reviews for installations that have cleanup sites. The QC review will be based on a standard checklist (see example checklist in Appendix 11).

5.10 QUALITY ASSURANCE (QA) REVIEW

An effective QA program implemented in accordance with estimating guidance and accounting standards provides reasonable assurance that cost estimates are completed within appropriate standards. USAEC will conduct annual quality assurance CTC reviews in each cleanup program area. QA reviews also assess the reliability of the processes and controls used to develop estimates. USAEC will maintain the planning, guidance, and results of the quality assurance process for audit review.

5.10.1 Scope

The QA reviews ensure that the process for developing and reviewing an estimate is validated and verified. The QA review will, at a minimum, evaluate:

- Documentation,
- Audit trail,
- Qualifications of estimators,
- Supervisory review, and
- Program manager's findings identified in the QC review.

USAEC will conduct QA reviews on no more than 20 percent of the installations that have cleanup sites.

5.10.2 Selection Criteria

Selection of installations for the annual AEC QA reviews will focus on installations that:

- Underwent a recent audit by DoDIG, AAA, or another outside entity;
- Have a CTC difference greater than 10 percent compared to the previous year;
- Have a total CTC in the Army's top 10 CTC installations;

- Are undertaking remedial action greater than $5 million for execution in the next 2 years;
- Have never been reviewed by USAEC; and/or
- Is a BRAC installation identified in the QC process?

Appendix 12 is an information paper with selection criteria and procedures for the annual QA reviews.

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APPENDIX 1

REFERENCES

Army Cleanup Program Installation Action Plan Guidance *Final,* 24 January 2006, https://aero.apgea.army.mil/.

Army DERP Management Guidance for Active Installations final—November 2004, http://aec.army.mil/dev/cleanup/derpguidance0411.pdf.

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Environmental Site Closeout Process Guide, U.S. EPA, September 1999.

Federal Financial Management Improvement Act of 1996, Pub. L. 104-208, 31 USC §3512.

Government Performance and Results Act of 1993, Pub. L. 103-62, 3 August 1993, http://www.whitehouse.gov/omb/mgmt-gpra/gplaw2m.html.

Government Management Reform Act of 1994, Pub. L. 103-356.

Guidance for Recognizing, Measuring, and Reporting Environmental Liabilities Not Eligible for Defense Environmental Restoration Program Funding, Office of the Deputy Undersecretary of Defense (Installations and Environment), ODUSD (I&E), November 2005.

Improving the Reporting of Environmental Liabilities, ASCIM Memorandum, 30 July 2004.

Management Guidance for the Defense Environmental Restoration Program, Office of the Assistant Deputy Undersecretary of Defense (Environment, Safety and Occupational Health), September 2001, https://www.denix.osd.mil/denix/Public/ES-Programs/Cleanup/guida.html#2.

Resource Conservation and Recovery Act of 1976, 42 USC §§6901-6992.

APPENDIX 2

DEFINITIONS

Adequate Documentation—A collection of pertinent project-related documents that support underlying factors, assumptions, and estimated costs, including background information, disposal or restoration strategy, physical units in the estimate, cost per unit, cost adjustments such as conversion to current year dollars, and significant project changes.

Army Environmental Database (AEDB)—A web-based automated information management system (which is operated and maintained by the U.S. Army Environmental Command) for integrating the Army's cleanup, conservation, compliance, and pollution prevention environmental data. The Army Environmental Database—Compliance-Related Cleanup (AEDB-CC) is a subset of the AEDB that will be developed and exclusively used for tracking all CC eligible projects at the site level (from project initiation to completion). AEDB-CC is the database of record for managing the Army's environmental liabilities for compliance-related cleanup. The Army Environmental Database—Restoration (AEDB-R) is a subset of the AEDB developed and exclusively used for tracking all DERP-eligible projects (except FUDS) at the site level (from project initiation to completion). AEDB-R is the database of record for managing the Army's environmental liabilities for DERP activities at active and BRAC installations.

Base Realignment and Closure (BRAC)—A DoD program that focuses on cleanup and compliance efforts at military installations undergoing closure or alignment, as authorized by Congress in five rounds of base closures for 1988, 1991, 1993, 1995, and 2005. The first BRAC round was conducted in 1988 based on recommendations by the Defense Secretary's Commission on Base Realignment and Closure. The Defense Base Closure and Realignment Act of 1990 is the statute for base closure and realignment rounds in 1991, 1993, 1995, and 2005. The Defense Environmental Restoration Program goal within the BRAC program is to conduct environmental remediation as efficiently as possible to speed transfer to and reuse by the community.

Closed Range—This older term refers to a military range that has been taken out of service as a range and has either been put to new uses that are incompatible with range activities or is not considered by the military to be a potential range area. The current term is "other than an operational range."

Compliance-Related Cleanup (CC) Site—A location not eligible for DERP funding where contaminants have been disposed, spilled, or otherwise released by DoD to the environment and that requires remediation beyond the initial/emergency response actions. A site is the basic unit for planning and implementing response actions. Requirements for overseas remediation and cleanup sites not eligible for DERP funding are programmed in the AEDB-CC.

Decision Document (DD)—Document that describes the final environmental response or corrective actions and remedial action goals at Army installations regardless of funding source (see Chapter 5). Decision Documents may include:

- A removal, interim remedial action, or remedial action decision at non-CERCLA sites;
- A Record of Decision at CERCLA sites, where remedial action decisions have been made;
- Statement of Basis or written regulatory approval; and
- Explosive Safety Submission approval.

Defense Site—Locations that are or were owned by, leased to, or otherwise possessed or used by DoD. The term does not include any operational range, operating storage or manufacturing facility, facility that is or was permitted for the treatment or disposal of military munitions.

Defense Environmental Restoration Program (DERP)—The DERP provides for the cleanup of substances and pollutants or contaminants (which may include hazardous waste) consistent with the provisions of the CERCLA as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA); the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) §300); and Executive Order (EO) 12580, Superfund Implementation. The DoD Management Guidance for the DERP addresses three umbrella environmental restoration areas: Active Installations, Base Realignment and Closure (BRAC), and Formerly Used Defense Sites (FUDS), which are defined as real property that was under the jurisdiction of the Secretary and owned by, leased by, or otherwise possessed by the United States (including governmental entities that are the legal predecessors of DoD or its Components) and those real properties where accountability rested with DoD but where the activities at the property were conducted by contractors [i.e., government-owned, contractor-operated (GOCO) properties] that were transferred from DoD control prior to 17 October 1986. The USACE executes FUDS for the DoD. Each of these restoration programs has three program categories. These program categories are: Installation Restoration Program (IRP) (refers to identifying, investigating, and cleaning up contamination at active/operating Army installations); Military Munitions Response Program (MMRP) (refers to a program that integrates explosives safety, ordnance, and environmental requirements to protect public safety, human health, and the environment); and Building Demolition/Debris Removal (BD/DR) (refers to the demolition and removal of unsafe buildings and structures at facilities or sites).

Discarded Military Munitions—Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations.

Environmental Liabilities—An obligation to make future expenditure due to past or ongoing activities that adversely affect the environment.

Excess Installations—A group of installations not covered by BRAC legislation that the Army has identified as excess to operational needs. The ACSIM BRAC Division has been assigned responsibility for property transfer at excess installations.

Formerly Used Defense Sites—Real property that was formerly owned by, leased by, possessed by, or otherwise under the jurisdiction of the Secretary of Defense or the Components (including governmental entities that are the legal predecessors of DoD or the Components) and those real properties where accountability rested with DoD but where the activities at the property were conducted by contractors (i.e., government-owned, contractor-operated (GOCO) properties) that were transferred from DoD control prior to October 17, 1986. The USACE is the program manager for FUDS.

Initial/Emergency Response Action—Action taken immediately after a release occurs or is discovered to prevent further migration. Initial/emergency response actions include, but are not limited to spill containment, initial cleanup, and disposal of response materials/wastes at the time of occurrence or discovery. An initial/emergency response action is not a CERCLA PA/SI or a RCRA Facility Assessment.

Land Use Controls—Physical, legal, or administrative mechanisms that restrict the use of, or limit access to, contaminated property in order to reduce risk to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and/or physical barriers to limit access to property, such as fences or signs. The legal mechanisms are generally the same as those used for institution controls (ICs) as discussed in the National Contingency Plan. ICs are a subset of LUCs and are primarily legal mechanisms imposed to ensure the continued effectiveness of land use restrictions imposed as part of a remedial decision. Legal mechanisms include restrictive covenants, negative easements, equitable servitudes, and deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions.

Liability—A probable future sacrifice of economic benefits arising from present obligations to transfer assets or provide services in the future as a result of past transactions or events.

Long-Term Management (LTM)—Term used for environmental monitoring, review of site conditions, and/or maintenance of a remedial action to ensure continued protection as designed once a site achieves Response Complete. Examples of LTM include landfill cap maintenance, leachate disposal, fence monitoring and repair, 5-year review execution, and land use control enforcement actions. This term should be used until no further environmental restoration response actions are appropriate or anticipated. LTM is reserved for monitoring once a site achieves Response Complete, and must not be used to refer to monitoring after Remedy in Place, (this includes sites for which the selected remedy is natural attenuation).

Military Munitions Response Program (MMRP)—The MMRP was established in 2001 to manage the environmental, health, and safety issues presented by unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC). The MMRP is an element of the DERP, under which the Secretary of Defense carries out environmental restoration resulting from historical activities. Under the MMRP category, the Army may conduct munitions response activities to address munitions and explosives of concern (MEC) or MC when: (1) The release occurred prior to 30 September 2002; and (2) The release is at a site that is not a FUDS, an operational range, an active munitions demilitarization facility, or an active waste military munitions (WMM) treatment or disposal unit that operated after 30 September 2002; and (3) The site's MMRP costs were not identified or included in AEDB-R prior to 30 September 2000.

Military Munitions—All ammunition products and components produced or used by or for the DoD or the U.S. Armed Services for national defense and security as described in 10 United States Code 2710(e)(3)(a).

Munitions Constituents (MC)—Materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

Munitions and Explosives of Concern (MEC)—Include unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents.

Munitions Response—Response actions, including investigation, removal actions, and remedial actions to address the explosives safety, human health, or environmental risks presented by unexploded ordnance, discarded military munitions, or munitions constituents.

Non-Federal, Federally Supported—A term that describes non-federally owned installations, facilities, activities, and properties that currently receive or have received federally appropriated funds, or are used to support the federal missions of the ARNG. Such missions include but are not

limited to, the training of troops, the firing of military munitions, and any other operation required for maintaining their status as a reserve component of the United States military.

Non-Operational or Other Than Operational Range—A range that is no longer used for training but (a) remains under Army control, (closed); (b) is no longer under military control and transferred to another entity (transferred); or (c) is proposed to be transferred or returned from the DoD to another entity (transferring).

Operational Range—A military range that is currently in service and is being regularly used for range activities, or a military range that is not currently being used, but that is still considered by the military to be a potential range area, and that has not been put to a new use that is incompatible with range activities.

Record of Decision (ROD)—The Record of Decision (ROD) is a public document that explains cleanup alternatives and outlines the selected remedy will be used to clean up a site. The ROD is created from information collected during and investigation (e.g., RI/FS).

Release—Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment. The term also includes abandoned or discarded barrels, containers, and other closed receptacles containing hazardous wastes or constituents of hazardous materials.

Remedial Action—Those actions consistent with permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or the environment. The term includes, but is not limited to, such actions at the location of the release as storage; confinement; perimeter protection using dikes, trenches, or ditches; clay cover; neutralization; cleanup of released hazardous substances and associated contaminated materials; recycling or reuse; diversion; destruction; segregation of reactive wastes; dredging or excavations; repair or replacement of leaking containers; collection of leachate and runoff; onsite treatment or incineration; provision of alternative water supplies; and any monitoring reasonably required to assure that such actions protect the public health, welfare, and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition off site of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

Remedial Action-Construction (RA-C)—The period during which the final remedy is being put in place. The end date signifies that the construction is complete, all testing has been accomplished and that the remedy will function properly.

Remedial Action Cost Engineering and Requirements (RACER)—A verified, validated, and accredited cost estimating software designed to provide the total cost to clean up a site, from initiation to final reporting.

Remedial Action-Operations (RA-O)—The period during which the remedy is in place and operating to achieve the cleanup objective identified in the ROD or equivalent agreement. Any system operation or monitoring requirements during this time shall be termed RA-O.

Remedy-in-Place (RIP)—Designation that a final remedial action has been constructed and implemented and is operating as planned in the remedial design. An example of a RIP is a pump-and-treat system that is installed, is operating as designed, and will continue to operate until cleanup levels have been attained. Because operation of the remedy is ongoing, the site cannot be considered Response Complete.

Removal—The cleanup or removal of released hazardous substances from the environment. Such actions may be taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 9604(b) of this title, and any emergency assistance which may be provided under the Disaster Relief and Emergency Assistance Act (42 USC 5121 et seq.). The requirements for removal actions are addressed in 40 CFR §§300.410 and 300.415. The three types of removals are emergency, time-critical, and non time-critical removals.

Response Complete (RC)—The remedy is in place, the remedial objectives outlined in the decision document have been met, and required remedial action–operations (RA-O) have been completed. If there is no RA-O phase, then the remedial action–construction end date will also be the RC date.

Site Closeout—The point at which DoD will no longer engage in active management or monitoring at an environmental cleanup site and no additional environmental funds will be expended unless additional cleanup is required. For practical purposes, site closeout occurs when cleanup goals are achieved that allow unrestricted use of the property (i.e., no further LTM, including institutional controls, is required). This definition applies to DERP and compliance-related cleanup program.

Supporting Documentation—The supporting original records/source documents identifying key features or parameters used to develop the CTC estimate.

Special Installation—An installation that primarily uses funds other than operation and maintenance funds to conduct traditional garrison operations in support of its primary mission. Special installations are generally very small, mostly industrial, and typically do not have a stand-alone installation staff. Command, control, manpower, and funding remain with the Army Commands. Several fund types are used in the operation of special installations, including Army Working Capital Funds (AWCF); Transportation Working Capital Funds (TWCF); Chemical Program funds; Defense Health Program (DHP) funds; Procurement Army Ammunition (PAA) funds; and Research, Development, Test, and Evaluation (RDT&E) funds.

Transferred Range—Now referred to as non-operational or other than operational range. A property formerly used as a military range that is no longer under military control and had been leased by DoD, transferred, or returned from the DoD to another entity, including federal entities. This includes a military range that is no longer under military control but was used under the terms of a withdrawal, executive order, special-use permit or authorization, right-of-way, public land order, or other instrument issued by the federal land manager. These ranges are not only in FUDS but could also be in active or BRAC installations.

Transferring Range—Now referred to as non-operational or other than operational range. A military range that is proposed to be transferred or returned from DoD to another entity, including

federal entities. This includes a military range that is used under the terms of a withdrawal, executive order, act of Congress, public land order, special-use permit or authorization, right-of-way, or other instrument issued by the federal land manager or property owner. An operational or closed range will not be considered a “transferring range” until the transfer is imminent. These ranges are not only in BRAC but could also be in active installations.

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

APPENDIX 3

ACRONYMS

AAA	Army Audit Agency
AAS	Aquifer Air Sparging
ACSIM	Assistant Chief of Staff for Installation Management
AECS	Army Environmental Cleanup Strategy
AEDB	Army Environmental Database
AEDB-CC	Army Environmental Database-Compliance-related Cleanup
AEDB-R	Army Environmental Database-Restoration
AERO	Army Environmental Reporting Online
AIU	Army Utility Interface
AMC	Army Materiel Command
AR	Army Regulation
ARNG	Army National Guard
ASA(I&E)	Assistant Secretary of the Army (Installations and Environment)
ASA(FM&C)	Assistant Secretary of the Army for Financial Management and Comptroller
AWCF	Army Working Capital Funds
BD/DR	Building Demolition/Debris Removal
BRAC	Base Realignment and Closure
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BV	Bioventing
CAO	Corrective Action Objective
CAP	Corrective Action Plan
CC	Compliance-Related Cleanup
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFO	Chief Financial Officers Act
CFR	Code of Federal Regulations
CHC	Chlorinated Hydrocarbons
CLIN	Contract Line Item Number
CMI-C	Corrective Measures Implementation- Construction
CMI-O	Corrective Measures Implementation-Operation
CMS	Corrective Measures Study

COC	Constituents of Concern
CONUS	Continental United States
COR	Contracting Officer's Representative
CTC	Cost to Complete
CY	calendar year
DD	Decision Document
DERP	Defense Environmental Restoration Program
DFAS	Defense Finance and Accounting Service
DHP	Defense Health Program
DMM	Discarded Military Munitions
DoD	Department of Defense
DoDI	DoD Instruction
DoDIG	DoD Inspector General
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
EO	Executive Order
ER	Environmental Restoration
ER,A	Environmental Restoration, Army
FFMIA	Federal Financial Management Improvement Act
FMR	Financial Management Regulation
FS	Feasibility Study
FUDS	Formerly Used Defense Site
FUDSMIS	Formerly Used Defense Site Management Information System
FY	Fiscal Year
GIS	Geographic Information Systems
GMRA	Government Management Reform Act
GOCO	Government-Owned, Contractor-Operated
GPRA	Government Performance and Results Act
IAP	Installation Action Plan
ICs	Institution Controls
IGCE	Independent Government Cost Estimate
IMA	Installation Management Agency
INV	Investigation
IR	Installation Restoration

IRA	Interim Remedial Action
IRP	Installation Restoration Program
LCPM	Life Cycle Program Management
LDR	Land Disposal Restrictions
LTM	Long-Term Management
LUCs	Land Use Controls
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MFR	Memorandum for Record
MNA	Monitored Natural Attenuation
MMRP	Military Munitions Response Program
MTBE	Methyl Tertiary Butyl Ether
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGB	National Guard Bureau
NPL	National Priorities List
O&M	Operation and Maintenance
ODEP	Office of the Director of Environmental Programs
ODUSD(I&E)	Office of the Deputy Undersecretary of Defense (Installations and Environment)
OMB	Office of Management and Budget
PA	Preliminary Assessment
PAA	Procurement Army Ammunition
PAH	Polynuclear Aromatic Hydrocarbons
PCBs	Poly-chlorinated Bi Phenols
POC	Point of Contact
POL	Petroleum, Oils, and Lubricants
POM	Program Objective Memorandum
PP&E	Property, Plant and Equipment
QA	Quality Assurance
QC	Quality Control
RA	Remedial Action
RA-C	Remedial Action-Construction
RACER	Remedial Action Cost Engineering and Requirements
RA-O	Remedial Action-Operation

RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDT&E	Research, Development, Test & Evaluation
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RIP	Remedy-In-Place
ROD	Record of Decision
RM	Resource Management
RRC	Regional Readiness Command
S&A	Supervision and Administration
SI	Site Investigation
SARA	Superfund Amendments and Reauthorization Act of 1986
SDEP	State Department of Environmental Protection
SOP	Standard Operating Procedure
SOW	Statement of Work
SVE	Soil Vapor Extraction
TCLP	Toxic Characteristic Leaching Procedure
TNT	Trinitrotoluene (dynamite)
TPH	Total Petroleum Hydrocarbons
TSDF	Treatment Storage and Disposal Facility
TWCF	Transportation Working Capital Funds
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USC	United States Code
USCHPPM	U.S. Center for Health Promotion and Preventive Medicine
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VAT	Value Added Tax
VOC	Volatile Organic Compound
WMM	Waste Military Munitions

APPENDIX 4

STATUTORY REFERENCES

1 Chief Financial Officers (CFO) ACT

1.1 In 1990, Congress passed the CFO Act, which calls for the federal government to establish a foundation of basic financial management practices that are common and considered vital in the private sector. It directs the Office of Management and Budget (OMB) to provide overall direction and leadership to the executive branch on financial management matters by establishing financial management policies and requirements.

1.2 The purpose of the CFO Act is to improve general and financial management practices in the federal government by requiring the development of an integrated financial management system, including financial reporting and internal controls. The Act also established a pilot project whereby certain agencies, including the Army, were required to prepare auditable, commercial-style financial statements for FY 1992. The OMB extended this requirement through FY 1995.

2 Government Performance and Results Act (GPRA)

2.1 While the CFO Act established the foundation for improving management and financial accountability among the agencies, the GPRA of 1993 is aimed more directly at improving an agency's program performance. The GPRA forces a shift in the focus of federal agencies away from such traditional concerns as staffing and activity levels towards a single overriding issue: results.

2.2 The GPRA requires first that agencies consult with Congress and other stakeholders to clearly define agency missions. It requires that agencies establish long-term strategic goals, as well as annual goals. Agencies must then measure their performance against their goals and report the results to the public. Within the environmental arena, the Army's DERP performance is measured against the DERP goals.

3 Government Management Reform Act (GMRA)

In 1994, Congress passed the GMRA, requiring all federal agencies, including the Army, to annually produce auditable financial statements beginning in FY 1996. As the accounting service for DoD agencies, the Defense Finance and Accounting Service (DFAS) prepares the Army's financial statements. The DoDIG is responsible to audit the Army financial statements in accordance with applicable generally accepted government auditing standards and submit a report to the Auditor General, Department of the Army.

4 Federal Financial Management Improvement Act (FFMIA)

4.1 The FFMIA of 1996 advances federal financial management by ensuring that federal financial management systems can and do provide reliable, consistent disclosure of financial data, and that they do so on a basis that is uniform across the federal

government, is consistent from year to year, and uses professionally-accepted accounting standards.

4.2 The FFMIA builds on the GMRA requirement for agencies to publish annual audited financial reports. It provides the basis for ongoing use of reliable financial information in program management and in oversight by the President, Congress, and the public.

4.3 The FFMIA impacts the Army as follows:

- The Army is required to implement and maintain systems that comply substantially with:
    - Federal financial management system requirements,
    - Applicable federal accounting standards, and
    - The Standard General Ledger at the transaction level.
- DoDIG is required to report on the Army's compliance with the three above stated requirements as part of financial statement audit reports.
- The Army is required to determine, based on the audit report and other information, whether its financial management systems (AEDB-CC, AEDB-R) comply with the FFMIA. If they do not, the Army is required to develop corrective or remedial action plans and file them with OMB.

APPENDIX 5

REPORTING GUIDANCE

The following publications provide additional program-specific information for completing CTC estimates and reporting to HQ:

1 Financial Management Regulation (FMR)

1.1 DoD Regulation 7000.14-R, "DoD Financial Management Regulation," Volume 4, Chapter 13, prescribes the accounting policy and principles for measuring, recognizing, and disclosing environmental liabilities, and the procedures to record DoD environmental liabilities. The policies and procedures prescribed in this chapter apply to all environmental liabilities regardless of the funding source and whether funding is available.

2 Defense Environmental Restoration Program (DERP)

2.1 DERP MANAGEMENT GUIDANCE

The DERP Management Guidance, September 2001, provides program implementation information for environmental restoration at active installations, facilities subject to BRAC, FUDS, and CTC estimates and financial reporting of environmental restoration liabilities that use Environmental Restoration, Army (ER,A) funds.

2.2. ARMY DERP MANAGEMENT GUIDANCE FOR ACTIVE INSTALLATIONS, NOVEMBER 2004

This Army DERP Management Guidance for Active Installations provides guidance on the management and execution of the Army Installation Restoration Program category, the Military Munitions Response Program category, and the Building Demolition and Debris Removal (BD/DR) Program category as related to environmental cleanup activities eligible for ER,A funds.

The Army DERP at active and excess installations applies to environmental restoration activities conducted on installations owned by, leased by, or otherwise "possessed" by the Army that are located in the United States, U.S. territories and possessions, and the District of Columbia, including the ARNG and Army Reserve installations.

2.3 ARMY DERP MANAGEMENT GUIDANCE FOR BRAC INSTALLATIONS, NOVEMBER 2004

This Army DERP Management Guidance for BRAC installations provides guidance on the management and execution of the Army Installation Restoration Program category, the newly created Military Munitions Response Program category, and the BD/DR Program category as they relate to environmental cleanup.

This management guidance applies to environmental restoration activities conducted on installations owned by, leased by, or otherwise "possessed" by the Army that are located

in the United States, U.S. territories and possessions, and the District of Columbia that are part of the BRAC program.

3 Non-Defense Environmental Restoration Program

3.1 DOD MANAGEMENT GUIDANCE FOR RECOGNIZING, MEASURING, AND REPORTING ENVIRONMENTAL LIABILITIES NOT ELIGIBLE FOR DEFENSE ENVIRONMENTAL RESTORATION PROGRAM FUNDING, NOVEMBER 2005

This document provides guidance to the DoD Components on the proper recognition, measurement, reporting, and disclosure of environmental liabilities not eligible for DERP funding. These liabilities will typically originate from ongoing activities or disposal of Property, Plant, and Equipment (PP&E). This document will refer to those liabilities as non-DERP liabilities throughout. The guidance is intended to assist Component personnel in determining when day-to-day activities will require future expenditure of resources to cover associated environmental cleanup, corrective, and disposal obligations that ultimately affect the accounting and financial reporting of non-DERP liabilities.

3.2 ACSIM MEMORANDUM, INTERIM ARMY ENVIRONMENTAL COMPLIANCE-RELATED CLEANUP IMPLEMENTATION GUIDANCE, 15 JULY 2004

This memorandum provides implementing guidance to the Army on the initial collection, validation, input, approval, and maintenance of compliance-related cleanup data in the AEDB-CC. This guidance applies to all Army installations or facilities (CONUS and overseas) with sites, not eligible under the DERP, where contaminants have been disposed, spilled, or otherwise released by DoD to the environment requiring a response beyond the initial/emergency response action.

3.3. ARMY COMPLIANCE-RELATED CLEANUP GUIDANCE MANUAL (INTERIM FINAL DRAFT, SEPTEMBER 2005)

The purpose of this guidance document is to aid Army personnel in meeting the challenge of planning and executing the CC program. The guidance applies to installations or facilities (whether overseas or within United States and territories) with sites not eligible for DERP, or FUDS program, and where contaminants have been disposed, spilled, or otherwise released by Army activities to the environment requiring a response beyond the initial/emergency response action. Generally, CC projects are undertaken to further investigate, and when necessary, to conduct response actions to address a release of contaminants at Army sites.

APPENDIX 6

RECOMMENDED SUPERVISORY REVIEW CHECKLIST

Installation Name_____

Review Date_____ Total Number of Sites Reviewed _____

Use this checklist to assess the reasonableness of the installation's estimates and to document supervisory review. List the site name, site ID, validation status, and estimator name and date on the attached site summary for each site. Provide applicable, relevant, and appropriate comments on the attached site summary for each site. Maintain the signed checklist reflecting final approval with the estimates as part of the audit trail.

1. **Are sound estimating methodology and reasonable assumptions used?** Does the database of record (i.e. AEDB-CC or AEDB-R) capture and document the assumptions used to develop the IAP and CTC? Does the information in the database match the information in the IAP?

2. **Did the estimator compare prior year estimates to the current year estimates and address unresolved comments from the previous data call QC review?** Did the assumptions used to determine the selected site remedial actions in the previous data call change? Changes to assumptions in the cost estimates may result in a change to the cost estimate. Comments are required if there is a 10% difference in costs from previous data call. Were the QC comments from the previous data call addressed?

3. **Does the estimate include all relevant phases and costs to complete the cleanup?** Does the estimate include all relevant phases and funding requirements to complete site restoration? Project completion may not require all phases. To ensure proper consideration and show that no phases are missing, provide explanation in comments if RA-O, CMI-O, or LTM phases are not included in the estimate.

4. **Is the estimate consistent with the operational plans of the Army?** Does the selected remedy provide site conditions consistent with the intended future land use? If future land use is a change from the current land use, provide comments to show any additional remedial actions support installation master planning.

5. **Does the estimator have the proper qualifications and required training to compile/generate the estimate?**

6. **Is there an adequate audit trail?** Are necessary memos for record included to document assumptions for cost estimates made early in the remediation process

where more complete remedial investigation, feasibility study, or other engineering cost estimates may not be available?

7. **Is there adequate documentation to support the underlying assumptions used to develop the estimate?** Were outlined procedures in the Guidelines for Developing Auditable Cost-to-Complete Estimates for the U.S. Army Environmental Cleanup Programs followed? Are appropriate documents included in the database of record?

8. **Does the supervisor agree with the underlying assumptions made to develop the estimates?** Are the assumptions and resulting estimates reasonable and phased properly?

9. **Is the estimate maintained in the current cost basis?** Ten percent or more change from last data call requires comment.

10. **Is or was the site listed in a different database of record (i.e., AEDB-CC, AEDB-R) for a previous data call?** Did the program switch funding accounts (i.e., ENVR to VENC)?

Supervisory Review Checklist (continued)

Site Summary

INSTALLATION NAME		VALIDATED ON PREVIOUS DATA CALL		ESTIMATOR NAME AND DATE OF ESTIMATE	COMMENTS
SITE ID	SITE NAME	Yes	No		

Supervisor's Signature_____ Date_____

Printed Name and Title _____

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APPENDIX 7

UNDERSTANDING THE ROLE OF CTC ESTIMATES FOR ENVIRONMENTAL LIABILITY REPORTING

1 Background

1.1 The Army requires an auditable cost estimate for all environmental requirements based on Public Law 101-576, "Chief Financial Officers Act of 1990," November 15, 1990. Each executive agency shall prepare and submit to the Director of the OMB a financial statement for the preceding fiscal year. The Chief Financial Officers (CFO) Act requires that financial statements prepared by an agency be audited by the Inspector General in accordance with applicable generally accepted government auditing standards and also requires the Inspector General to submit a report to the head of the audited agency.

1.2 Army management uses budgetary estimates to report environmental liabilities on the Army financial statements. ***Because environmental budgetary estimates are used for financial statement reporting, the estimates are subject to financial management and accounting standards and are subject to audit. Financial management and accounting standards require supporting documentation for cost estimates***.

1.3 The Department of the Army Comptroller imposed a rigorous set of requirements and an aggressive schedule to obtain an unqualified audit opinion on its financial statements. The schedule requires that the Army financial statements achieve a qualified audit opinion by the end of FY 2007 and an unqualified opinion by FY 2010. A qualified audit opinion means that some limitations exist with parts of the agency's financial statements, such as an inability to gather certain information. An unqualified opinion states that the auditor feels the agency followed all accounting rules appropriately and that the financial statements are an accurate representation of the agency's financial condition.

1.4 An important distinction to keep in mind is that the cost estimates and the associated documentation falls to the functional community, and the financial community uses those cost estimates to develop the environmental liability estimates that are appropriately recognized and disclosed on the financial statements.

2 Definition

2.1 An environmental liability is a probable and measurable future outflow or expenditure of resources that exist as of the financial reporting date for environmental cleanup costs resulting from past transactions or events.[8] Simply stated, an environmental liability is an obligation to make a future expenditure resulting from past or present events that have the potential to adversely affect the environment. This includes costs associated with environmental (1) cleanup/corrective actions, (2) closure requirements at ongoing

[8]FMR Vol. 4, Chapter 13, Section 130202.

operations, and (3) disposal, including weapon system disposal. Environmental liabilities at overseas DoD locations will be recognized as stated in FMR Volume 4, Chapter 13.

3 Reporting Environmental Liabilities

3.1 Each fiscal year, the Assistant Secretary of the Army for Financial Management and Comptroller, ASA(FM&C), issues a request for actual and contingent liabilities for Army environmental programs. The FMR and DoD environmental program guidance requires all components to calculate the cost-to-complete estimate for each cleanup program category [i.e., Active Installation—Environmental Restoration (ER), BRAC Installation—ER, Active Installation—Corrective Action] and use these values as the basis for reporting environmental liabilities. CTC estimates do not represent the Army's environmental liability in totality. Other estimates such as outlay rates for expenditure of unliquidated obligations are included with the compiled CTC to form the total environmental liability for each cleanup program.) Besides the requirement for an environmental legal driver, three additional tests must be met to be considered as an environmental liability: (1) the contamination must have already occurred; (2) a response action must be "probable;" and (3) costs for response actions must be "reasonably estimable."

3.2 Note 14 in DoD's financial statements, entitled "Environmental and Disposal Liabilities" and the accompanying narrative ("Other Information Related to Environmental Liabilities," also known as the footnote) is the applicable note to report environmental liabilities. Note 14 has four categories: Accrued Environmental Restoration (DERP funded) Costs, Other Accrued Environmental Costs (non-DERP), BRAC, and Environmental Disposal for Weapon Systems Programs. Non-DERP liabilities are reported primarily in two broad categories in Note 14 ("Other Accrued Environmental Costs" and "Environmental Disposal for Weapons Systems Programs") with the remaining portion under the BRAC category. The total liability for each activity line on Note 14 is identified and reported as two subsets (current and non-current) of the total liability.[9]

3.3 CTC estimates and the values reported for inclusion in the annual financial statements for environmental liabilities must be consistent with each other and able to withstand an audit. In addition, these values must be consistent with the estimates listed in the IAP and in any reports provided to outside entities, such as in the Defense Environmental Programs Annual Report to Congress. Army-specific guidelines for developing auditable CTC estimates are included in Chapter 5 of this guidance.

3.4 Reported environmental liabilities (based on site-level CTC estimates) must be consistent from the point of origin (usually the installation) and throughout the chain of command. Site level data reporting is the responsibility of the installation unless otherwise designated. The following systems are the database of record for managing the Army Environmental Cleanup Liabilities: AEDB-R for active, excess, and BRAC installations under DERP, FUDS Management Information System (FUDSMIS) for the FUDS Program,

[9] For Information on Note 14 on environmental liabilities and disposal liabilities, see http://www.dod.mil/comptroller/fmr/06b/06b_10.pdf, pages 84-108, Note 14 Environmental Liabilities Reporting.

and AEDB-CC for Compliance-Related Cleanup. Supporting documentation must match what is reported in the data systems.

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APPENDIX 8

EXAMPLES OF CTC ESTIMATES WITH REQUIRED DOCUMENTATION

The following scenarios are examples to assist estimators with creating an auditable cost estimate with documentation. An MFR must be provided for all estimates and contain the information in section 5.4. The MFR must be signed and dated by the estimator and the reviewer who ensures that estimating methodology, facts, and assumptions are appropriate for the site cost estimate and that the documentation supports the estimate. The MFR must also be maintained in the CTC estimate file.

Pre Feasibility Study/Decision Document

Scenario 1: Estimates Developed using RACER

The main objective is to ensure that the estimator has documented the assumptions and other sources used to develop the RACER estimate. Regardless of whether or not the RACER estimate has site documents, an MFR must be provided.

RACER was used because the investigation phase is ongoing and the feasibility study is not complete. Army guidance requires estimators to use RACER to develop estimates for sites that have not completed a Feasibility Study/Corrective Measures Study.

The following information is required to produce an estimate for a cleanup site:

- Action to be taken,
- Quantity or amount of that action, and
- Duration of the action, if recurring.

The action represents the restoration/cleanup strategy which is addressed annually in the IAP. The cost estimator should ensure that the estimate reflects the restoration/cleanup strategy in the IAP.

Sources for actions and quantities may be SI, RI, Inspection Report, etc., or any draft or final documentation generated for the site. Assumptions based on the estimator's professional judgment must be documented in the MFR. The cost estimator must use the information in the supporting documents as input parameters to generate the RACER estimates. The supporting documentation must also be maintained in the CTC estimate file to ensure an audit trail.

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR

Site CCFG135. During construction work, unknown petroleum, oil, and lubricants (POL) contamination of soil was detected after several buildings and sheds were demolished. The source was most likely a former diesel fuel tank (approx. 8,000 gallon), used for vehicle refueling of tenant units in the 1970s. A SI was conducted in July 2004 that confirmed POL contamination in soil and groundwater. The State Water Office requires delineation and cleanup of the contaminated soil and delineation of the polluted groundwater and remediation.

The remedial action will include: excavation, intermediate storage, and orderly disposal of contaminated soil (approximately 500 yd^3); installation of groundwater monitoring wells; sampling and analysis of soil and groundwater; and installation and operation of a groundwater remediation system.

Discussion

The estimator used the RACER software to prepare the estimate for Site CCFG135. Army guidance requires estimators to use RACER to develop estimates for sites that have not completed a Feasibility Study/Corrective Measures Study.

Since there is no supporting document, the estimator has prepared an MFR that provides the assumptions used as the basis of the estimate, the date prepared, the estimator's name, and evidence of supervisory approval.

Required Documentation:

Since there are insufficient supporting documents for developing an estimate for this site, the required documentation is the MFR. In this case, the MFR may be written or generated using the Cost Summary Report from RACER.

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR

Cost Summary Report

Assembly	Direct Cost	Marked Up Cost

Folder: Example

Installation Name:	EAST CAMP CLEANUP
Installation Number:	FE186
Cost Database Date:	2005
Cost Type:	System
Description:	This estimate was imported or upgraded from a previous version of RACER and contained no information in this Description field.
Site Name:	FE186-Former Motor Park
Site Number:	CCFG135
Description:	During construction work, unknown POL contamination of soil was detected after several buildings and sheds were demolished. Source is probably a former approx. 30,000 l (8,000 gallon) diesel fuel tank, used for vehicle refueling of tenant units in the 1970s. The analysis results in soil show a maximum of 2700 mg/kg (regulatory limit =1000 mg/kg); the groundwater analysis results of a temporary shallow well are: TPH = 7100 µg/l (regulatory limit requiring remediation is 1000 µg/l), BTEX = 141 µg/l (regulatory limit requiring remediation is 100 µg/l) and CHC = 11.5 µg/l (regulatory limit requiring further investigation is 10 µg/l). State Laws require delineation and clean up of the contaminated soil and groundwater. Planned remediation is excavation, intermediate storage and orderly disposal of contaminated soil (approximately 500 yd3); installation of groundwater monitoring wells; sampling and analysis of soil and groundwater; operation of a groundwater remediation system; and long term management to monitor for 2 years.
Program:	N/A

Estimator Information:

Name:	Robert Signer Rob Signer 10/3/05
Title:	Engineer
Agency/Org./Office:	Environmental Consulting
Business Address:	123 Little Street Portland, ME 04103 USA
Phone:	888 555 1212
Email:	rob.signer@ec.com
Prepared Date:	05/18/2005

Reviewer Information:

Name:	Citizen King Citizen King 10/3/05
Title:	Engineer
Agency/Org./Office:	Environmental Consulting
Business Address:	123 South Cubicle Cleanup Portland, ME 04103 USA
Phone:	888 555 1212
Email:	citizen.king@ec.com
Date Reviewed:	05/20/2005

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 1 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
Phase Name:	RI/FS Feasibility Study		
Phase:	Study		
Description:	Groundwater at the site has not been delineated. Only one sample point has been installed. Assume that 10 borings and 8 wells will be installed and sampled for 2 rounds. Compose RI Report, FS report, and Decision Document.		
Technology:	**Feasibility Study**	# 1	
Development/Screening of Alternatives			
33220102	Project Manager	107	327
33220103	Office Manager	40	121
33220105	Project Engineer	520	1,585
33220106	Staff Engineer	1,335	4,068
33220108	Project Scientist	40	122
33220109	Staff Scientist	178	544
33220110	QA/QC Officer	88	267
33220114	Word Processing/Clerical	46	141
33240101	Other Direct Costs	50	66
Analysis of Alternatives			
33220102	Project Manager	107	327
33220103	Office Manager	119	362
33220105	Project Engineer	381	1,162
33220106	Staff Engineer	1,244	3,791
33220108	Project Scientist	241	734
33220109	Staff Scientist	922	2,810
33220110	QA/QC Officer	146	446
33220111	Certified Industrial Hygienist	111	339
33220114	Word Processing/Clerical	232	706
33220115	Draftsman/CADD	141	431
33240101	Other Direct Costs	77	102
Remedy Selection			
33220102	Project Manager	250	763
33220103	Office Manager	158	483
33220105	Project Engineer	693	2,113
33220106	Staff Engineer	1,274	3,883
33220108	Project Scientist	642	1,957
33220109	Staff Scientist	595	1,813
33220110	QA/QC Officer	117	356
33220114	Word Processing/Clerical	293	894
33220115	Draftsman/CADD	40	123
33240101	Other Direct Costs	86	114
Total Feasibility Study Technology		**10,276**	**30,949**
Technology:	**Remedial Investigation**	# 1	
Comment:	Assume a simple RI with the installation of 8 wells. Semi-annual sampling for 1 year.		
Site Characterization			
33220102	Project Manager	143	436
33220103	Office Manager	79	241

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 2 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33220105	Project Engineer	416	1,268
33220106	Staff Engineer	971	2,958
33220108	Project Scientist	481	1,467
33220109	Staff Scientist	2,974	9,063
33220110	QA/QC Officer	234	713
33220111	Certified Industrial Hygienist	148	452
33220112	Field Technician	443	1,350
33220114	Word Processing/Clerical	494	1,505
33220115	Draftsman/CADD	161	492
33240101	Other Direct Costs	96	126
Sampling and Analysis			
33010104	Sample collection, vehicle mileage charge, car or	47	47
33020343	Photo-Ionization Detector, HnU, Weekly Rental	339	448
33020401	Disposable Materials per Sample	222	293
33020402	Decontamination Materials per Sample	197	261
33020533	Water level indicators, electronic, with light & h	888	1,174
33020601	Auger holes in earth, no samples, 2-1/2" diameter	724	1,137
33021102	Testing, moisture content (209a)	206	273
33021509	Monitor well sampling equipment, rental, water qua	230	304
33021603	Testing, dissolved solids	209	276
33021604	Testing, suspended solids	184	243
33021631	Testing, chlorinated hydrocarbons (612, 8120)	3,592	4,747
33021694	Total Petroleum Hydrocarbons (SW8015B), Water Anal	1,355	1,791
33021722	Polynuclear Aromatic Hydrocarbons(PAH) (SW 8310),w	1,067	1,410
33021732	Testing, soil & sediment analysis, total petroleum	483	638
33021776	BTEX/MTBE/TVPH (EPA 8021B/8015B), Soil Analysis	678	896
33022134	Testing, PAH (SW3510/SW8310)	3,339	4,413
33022150	BTEX/MTBE/TVPH (EPA 8021B/8015B), Water Analysis	2,134	2,821
33220112	Field Technician	1,019	3,106
33231172	Split Spoon Sample, 2" x 24," During Drilling	645	852
33231178	Move Rig/Equipment Around Site	2,289	3,394
33231182	DOT steel drums, 55 gal., open, 17C	404	534
33231186	Well Development Equipment Rental (weekly)	462	623
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 3	95	125
33232422	Bailer accessories, suspension cable, teflon coated	253	334
33232423	Bailer accessories, hand reel, holds 300'-500'	10	13
Total Remedial Investigation Technology		**27,711**	**50,223**
Technology:	**Groundwater Monitoring Well**	# 1	
Comment:	Install 8 wells. Assume that 1 soil sample well be collected from each well.		
Aquifer 1			
33020303	Organic Vapor Analyzer Rental, per Day	226	298
33021102	Testing, moisture content (209a)	367	485
33021722	Polynuclear Aromatic Hydrocarbons(PAH) (SW8310)	1,897	2,507
33021732	Testing, soil & sediment analysis, total petroleum	859	1,135

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 3 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33021776	BTEX/MTBE/TVPH (EPA 8021B/8015B), Soil Analysis	1,205	1,592
33170808	Decontaminate Rig, Augers, Screen (Rental Equipmen	633	1,035
33220112	Field Technician	1,130	3,443
33230102	4" PVC, Schedule 40, Well Casing	967	1,394
33230202	4" PVC, Schedule 40, Well Screen	1,808	2,584
33230302	4" PVC, Well Plug	328	454
33231103	Hollow Stem Auger, 11" Dia Borehole, Depth <= 100	5,431	7,963
33231173	Split Spoon Sampling	1,144	1,677
33231182	DOT steel drums, 55 gal., open, 17C	646	854
33231402	4" Screen, Filter Pack	1,689	2,406
33231812	4" Well, Portland Cement Grout	64	85
33232102	4" Well, Bentonite Seal	734	1,052
General Aquifers			
33010101	Mobilize/DeMobilize Drilling Rig & Crew	1,609	2,448
33231504	Surface Pad, Concrete, 2' x 2' x 4"	379	529
33232301	5' Guard Posts, Cast Iron, Concrete Fill	2,434	3,720
Total Groundwater Monitoring Well Technology		**23,551**	**35,661**
Technology:	**Residual Waste Management**	# 1	
33190103	Secondary containment and storage, storage systems	33	52
33190204	Subcontracted shipping of hazardous waste, transpo	101	134
33190317	Commercial RCRA landfills, additional landfill dis	439	580
33197205	Commercial RCRA landfills, drummed waste disposal,	122	161
Total Residual Waste Management Technology		**695**	**927**
Total Phase RI/FS Feasibility Study		**62,234**	**117,760**

Phase Name: Remedial Design
Phase: Design
Description: Design for ORC injection with MNA

Technology:	**Remedial Design (Percent)**	# 1	
	Remedial Design (RA)	10,704	19,286
	Remedial Design (RA)	11,421	20,427
	Remedial Design (RA)	0	0
Total Remedial Design (Percent) Technology		**22,125**	**39,713**
Total Phase Remedial Design		**22,125**	**39,713**

Phase Name: RA—ORC Year 2
Phase: Remedial Action
Description: Use ORC barrier to enhance biodegradation of contaminants. Assume 2 50 m barriers downgradient of the source area. Replenish barrier every 6 months for 2 years. Install 2 sentinel wells to monitor downgradient edge of plume.

Technology: **Professional Labor Management** # 1

Comment: Permitting and Public Notice have been deleted because they are not applicable.

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 4 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
Professional Labor Percentage			
33220138	Project Management Labor Cost	3,949	11,923
33220139	Planning Documents Labor Cost	3,686	11,128
33220140	Construction Oversight Labor Cost	3,160	9,539
33220141	Reporting Labor Cost	527	1,590
33220142	As-Built Drawings Labor Cost	527	1,590
33220143	Public Notice Labor Cost	0	0
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	0	0
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**11,848**	**35,770**
Technology:	**In Situ Biodegradation (Saturated Zone)**		# 1
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Inc	12,000	15,654
33020668	Mobilize Direct Push Rig and Crew	565	737
33020669	Demobilize Direct Push Rig and Crew	565	737
33021509	Monitor well sampling equipment, rental, water qua	230	300
33021913	Testing, biomonitoring & bioassay, laboratory benc	2,182	2,846
33220105	Project Engineer	1,733	5,232
33220112	Field Technician	4,431	13,377
33231187	Load Supplies/Equipment	746	1,077
33330191	Oxygen Release Compound (ORC), 15,000 to 40,000 lb	16,844	21,971
Total In Situ Biodegradation (Saturated Zone) Technology		**39,295**	**61,929**
Technology:	**In Situ Biodegradation (Saturated Zone)**		# 2
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Inc	12,000	15,654
33020668	Mobilize Direct Push Rig and Crew	565	737
33020669	Demobilize Direct Push Rig and Crew	565	737
33021509	Monitor well sampling equipment, rental, water qua	230	300
33021913	Testing, biomonitoring & bioassay, laboratory benc	2,182	2,846
33220105	Project Engineer	1,733	5,232
33220112	Field Technician	4,431	13,377
33231187	Load Supplies/Equipment	746	1,077
33330191	Oxygen Release Compound (ORC), 15,000 to 40,000 lb	16,844	21,971
Total In Situ Biodegradation (Saturated Zone) Technology		**39,295**	**61,929**
Technology:	**Natural Attenuation**		# 1
Comment:	Natural Attenuation should be in the operations phase. However, RACER 7.0 does not allow selection of natural attenuation in the operations phase. Quarterly sampling for TPH BTEX and CHCs for 1 year.		
Groundwater			
33020401	Disposable Materials per Sample	148	193
33020402	Decontamination Materials per Sample	132	172
33020561	Lysimeter accessories, nylon tubing, 1/4” OD	91	119
33021509	Monitor well sampling equipment, rental, water qua	230	300
33021602	Testing, soil & sediment analysis, pH, electrometr	119	155

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 5 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33021603	Testing, dissolved solids	209	273
33021608	Testing, nitrogen, nitrate/nitrite	394	515
33021631	Testing, chlorinated hydrocarbons (612, 8120)	3,592	4,686
33021663	Testing, dissolved oxygen (DO)	233	304
33021667	Testing, soil & sediment analysis, sulfates (375.3	309	402
33021668	Testing, sulfur: sulfate, sulfide, sulfite	495	646
33021673	Testing, total organic carbons	424	553
33021678	Ferrous Iron (S.M. 3500 Fe—D)	1,587	2,070
33021679	Dissolved Iron (II)	493	644
33021694	Total Petroleum Hydrocarbons (SW8015B), Water Anal	1,355	1,768
33022134	Testing, PAH (SW3510/SW8310)	3,339	4,356
33022150	BTEX/MTBE/TVPH (EPA 8021B/8015B), Water Analysis	2,134	2,784
33230509	4” Submersible Pump Rental, Day	149	195
33231186	Well Development Equipment Rental (weekly)	462	614
General			
33010104	Sample collection, vehicle mileage charge, car or	97	97
33010202	Sample collection, sampling personnel travel, per	688	688
33020577	Oxygen/reduction potential meter rental	229	298
33220102	Project Manager	143	432
33220105	Project Engineer	1,040	3,139
33220108	Project Scientist	3,972	11,992
33220109	Staff Scientist	2,379	7,182
33220112	Field Technician	1,617	4,883
33220114	Word Processing/Clerical	324	978
33220115	Draftsman/CADD	343	1,035
Total Natural Attenuation Technology		**26,728**	**51,471**
Total Phase RA—ORC Year 2		**117,166**	**211,100**

Phase Name: RA—ORC Year 1
Phase: Remedial Action
Description: Use ORC barrier to enhance biodegradation of contaminants. Assume 2 50 m barriers downgradient of the source area. Replenish barrier every 6 months for 2 years. Install 2 sentinel wells to monitor downgradient edge of plume.

Technology: **Natural Attenuation** # 1

Comment: Natural Attenuation should be in the operations phase. However, RACER 7.0 does not allow selection of natural attenuation in the operations phase. Quarterly sampling for TPH BTEX and CHCs for 1 year.

Groundwater			
33020401	Disposable Materials per Sample	148	193
33020402	Decontamination Materials per Sample	132	172
33020561	Lysimeter accessories, nylon tubing, 1/4” OD	91	119
33021509	Monitor well sampling equipment, rental, water qua	230	300
33021602	Testing, soil & sediment analysis, pH, electrometr	119	155
33021603	Testing, dissolved solids	209	273
33021608	Testing, nitrogen, nitrate/nitrite	394	515
33021631	Testing, chlorinated hydrocarbons (612, 8120)	3,592	4,686
33021663	Testing, dissolved oxygen (DO)	233	304

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 6 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
33021667	Testing, soil & sediment analysis, sulfates (375.3	309	402
33021668	Testing, sulfur: sulfate, sulfide, sulfite	495	646
33021673	Testing, total organic carbons	424	553
33021678	Ferrous Iron (S.M. 3500 Fe—D)	1,587	2,070
33021679	Dissolved Iron (II)	493	644
33021694	Total Petroleum Hydrocarbons (SW8015B), Water Analysis	1,355	1,768
33022134	Testing, PAH (SW3510/SW8310)	3,339	4,356
33022150	BTEX/MTBE/TVPH (EPA 8021B/8015B), Water Analysis	2,134	2,784
33230509	4” Submersible Pump Rental, Day	149	195
33231186	Well Development Equipment Rental (weekly)	462	614
General			
33010104	Sample collection, vehicle mileage charge, car or	97	97
33010202	Sample collection, sampling personnel travel, per	688	688
33020577	Oxygen/reduction potential meter rental	229	298
33220102	Project Manager	143	432
33220105	Project Engineer	1,040	3,139
33220108	Project Scientist	3,972	11,992
33220109	Staff Scientist	2,379	7,182
33220112	Field Technician	1,617	4,883
33220114	Word Processing/Clerical	324	978
33220115	Draftsman/CADD	343	1,035
Total Natural Attenuation Technology		**26,728**	**51,471**
Technology:	**Groundwater Monitoring Well**	# 1	
Aquifer 1			
33020303	Organic Vapor Analyzer Rental, per Day	113	147
33021102	Testing, moisture content (209a)	96	126
33021722	Polynuclear Aromatic Hydrocarbons(PAH) (SW 8310),w	474	619
33021732	Testing, soil & sediment analysis, total petroleum	261	340
33021776	BTEX/MTBE/TVPH (EPA 8021B/8015B), Soil Analysis	301	393
33170808	Decontaminate Rig, Augers, Screen (Rental Equipmen	111	145
33220112	Field Technician	213	644
33230102	4” PVC, Schedule 40, Well Casing	302	422
33230202	4” PVC, Schedule 40, Well Screen	226	313
33230302	4” PVC, Well Plug	82	111
33231128	Air Rotary, 8” Dia Borehole (Consolidated), Depth	1,418	2,006
33231173	Split Spoon Sampling	286	405
33231182	DOT steel drums, 55 gal., open, 17C	155	203
33231402	4” Screen, Filter Pack	246	341
33231812	4” Well, Portland Cement Grout	23	29
33232102	4” Well, Bentonite Seal	184	255
General Aquifers			
33010101	Mobilize/DeMobilize Drilling Rig & Crew	2,502	3,540
33231504	Surface Pad, Concrete, 2’ x 2’ x 4”	220	330
Total Groundwater Monitoring Well Technology		**7,214**	**10,368**

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 7 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
Technology:	**Professional Labor Management**		# 1
Comment: Permitting and Public Notice have been deleted because they are not applicable.			
Professional Labor Percentage			
33220138	Project Management Labor Cost	4,220	12,740
33220139	Planning Documents Labor Cost	3,939	11,891
33220140	Construction Oversight Labor Cost	3,376	10,192
33220141	Reporting Labor Cost	563	1,699
33220142	As-Built Drawings Labor Cost	563	1,699
33220143	Public Notice Labor Cost	0	0
33220144	Site Closure Activities Labor Cost	0	0
33220145	Permitting Labor Cost	0	0
33220146	Responsible Party Labor Cost	0	0
33220147	Reimbursement Claims Preparation Labor Cost	0	0
33220148	Other Labor Cost	0	0
Total Professional Labor Management Technology		**12,660**	**38,220**
Technology:	**In Situ Biodegradation (Saturated Zone)**		# 1
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Inc	12,000	15,654
33020668	Mobilize Direct Push Rig and Crew	565	737
33020669	Demobilize Direct Push Rig and Crew	565	737
33021509	Monitor well sampling equipment, rental, water qua	230	300
33021913	Testing, biomonitoring & bioassay, laboratory benc	2,182	2,846
33220105	Project Engineer	1,733	5,232
33220112	Field Technician	4,431	13,377
33231187	Load Supplies/Equipment	746	1,077
33330191	Oxygen Release Compound (ORC), 15,000 to 40,000 lb	16,844	21,971
Total In Situ Biodegradation (Saturated Zone) Technology		**39,295**	**61,929**
Technology:	**In Situ Biodegradation (Saturated Zone)**		# 2
33020667	Direct Push Rig, Truck Mounted, Non Hydraulic, Inc	12,000	15,654
33020668	Mobilize Direct Push Rig and Crew	565	737
33020669	Demobilize Direct Push Rig and Crew	565	737
33021509	Monitor well sampling equipment, rental, water qua	230	300
33021913	Testing, biomonitoring & bioassay, laboratory benc	2,182	2,846
33220105	Project Engineer	1,733	5,232
33220112	Field Technician	4,431	13,377
33231187	Load Supplies/Equipment	746	1,077
33330191	Oxygen Release Compound (ORC), 15,000 to 40,000 lb	16,844	21,971
Total In Situ Biodegradation (Saturated Zone) Technology		**39,295**	**61,929**
Total Phase RA—ORC Year 1		**125,191**	**223,919**

Phase Name: RA Excavation

Phase: Remedial Action

Description: Excavation of contaminated soil and offsite disposal.

Note: This report shows first year costs.

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
Technology:	**Excavation**	# 1	
Comment:	General area of contamination from the leaking tank system measured approximately 135 by 10 feet to a depth of 10 feet (500 yd3)		
17030277	Excavate and load, bank measure, medium material,	510	784
17030418	Delivered & Dumped, Backfill with Stone	642	853
17030423	Unclassified Fill, 6" Lifts, Off-Site, Includes De	5,477	7,560
33080584	Landfill gas and leachate control systems, synthet	740	1,013
33170803	Spray washing, decontaminate heavy equipment, decon	267	440
Total Excavation Technology		**7,635**	**10,651**
Technology:	**Load and Haul**	# 1	
Comment:			
Disposal costs are $100 per yd3			
17020401	Dump Charges	50,000	66,077
17030221	916, 1.5 CY, Wheel Loader	651	986
17030285	12 CY, Dump Truck	2,744	4,101
Total Load and Haul Technology		**53,395**	**71,164**
Total Phase RA Excavation		**61,030**	**81,814**
Phase Name:	LTM—Monitoring and Site Closeout		
Phase:	Long Term Monitoring		
Description:	GW Monitoring for 2 years and site close out documentation.		
Technology:	**Monitoring**	# 1	
Comment:			
Annual GW monitoring of 2 wells for TPH, BTEX, and CHCs			
Groundwater			
33020401	Disposable Materials per Sample	33	47
33020402	Decontamination Materials per Sample	29	42
33021509	Monitor well sampling equipment, rental, water qua	230	327
33021603	Testing, dissolved solids	46	66
33021604	Testing, suspended solids	41	58
33021631	Testing, chlorinated hydrocarbons (612, 8120)	798	1,137
33021694	Total Petroleum Hydrocarbons (SW8015B), Water Analysis	301	429
33022134	Testing, PAH (SW3510/SW8310)	742	1,057
33022150	BTEX/MTBE/TVPH (EPA 8021B/8015B), Water Analysis	474	675
33231186	Well Development Equipment Rental (weekly)	462	671
33231189	DOT steel drums, 55 gal., open, 17C	162	230
33232407	PVC bailers, disposable polyethylene, 1.50" OD x 3	12	17
General Monitoring			
33010104	Sample collection, vehicle mileage charge, car or	24	24
33010202	Sample collection, sampling personnel travel, per	172	172
33220112	Field Technician	354	1,151

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 9 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR (continued)

Cost Summary Report

Assembly		Direct Cost	Marked Up Cost
Total Monitoring Technology		**3,881**	**6,102**
Technology:	**Site Close-Out Documentation**		# 1
Comment:			
Expect to receive No Further Action after 2 years of monitoring in LTM. Ten (10) monitoring wells will be properly abandoned.			
Abandon wells			
33220106	Staff Engineer	30	98
33220109	Staff Scientist	30	97
Documents			
33220102	Project Manager	71	232
33220106	Staff Engineer	121	394
33220114	Word Processing/Clerical	31	100
33220115	Draftsman/CADD	20	66
Total Site Close-Out Documentation Technology		**304**	**987**
Total Phase LTM—Monitoring and Site Closeout		**4,185**	**7,089**
Total Site FE186-Former Motor Park		**391,930**	**681,395**
Total Installation EAST CAMP CLEANUP		**391,930**	**681,395**

Note: This report shows first year costs.

Print Date: 09-28-2005 This report for official U.S. Government use only. Page: 10 of 11

Example 1: RACER Estimate with no Supporting Documentation with RACER-Generated MFR

Cost Summary Report

Assembly	Direct Cost	Marked Up Cost
Total Folder Example	**391,930**	**681,395**

Example 1 Alternate MFR: RACER Estimate with MFR and no Supporting Documentation

DEPARTMENT OF THE ARMY
East Camp Cleanup
12345 ARMY HIGHWAY 27
East Camp Cleanup, VIRGINIA 12345-6789

30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Site CCFG135.

1. This memorandum serves as formal documentation of the information used to develop the CTC estimate for East Camp Cleanup. The documented assumptions are based on best professional judgment.

2. Background Information and strategy: During construction work, unknown POL contamination of soil was detected after several buildings and sheds were demolished. Source is probably a former approximately 30,000-liter (8,000-gallon) diesel fuel tank used for vehicle refueling of tenant units in the 1970s. The analysis results in soil show a maximum of 2700 mg/kg (regulatory limit = 1000 mg/kg), the groundwater analysis results of a temporary shallow well are: TPH = 7100 µg/l (regulatory limit requiring remediation is 1000 µg/l), BTEX = 141 µg/l (regulatory limit requiring remediation is 100 µg/l) and CHC = 11.5 µg/l (regulatory limit requiring remediation is 10 µg/l). State laws require delineation and clean up of the contaminated soil and groundwater. Planned remediation is excavation, intermediate storage and orderly disposal of contaminated soil (approximate 500 cubic yards), installation of groundwater monitoring wells, sampling and analysis of soil and groundwater, operation of a groundwater remediation system, and long-term management to monitor for 2 years.

3. Assumptions: For the investigation and delineation of soil and groundwater contamination assume 10 borings and 8 groundwater monitoring wells will be installed and sampled for 2 rounds. The groundwater remedial action is assumed to be two 50 meter ORC barriers downgradient of the source area to enhance biodegradation of contaminants. The barrier is anticipated to be replenished every 6 months for 2 years. Two sentinel wells will be installed downgradient to monitor the edge of the plume. Quarterly groundwater monitoring for natural attention of the TPH, BTEX, and CHCs will occur for one year.

   Soil contamination will be cleaned up by excavation of an area approximately 135 long by 10 feet wide x 10 feet deep (500 cubic yards). The area will be backfilled with stone. The contaminated soil will be disposed of off-site at a cost of approximately $100 per cubic yard.

   Long-term management will be annual groundwater monitoring for two years with analyses for TPH, BTEX, and CHCs. After two years, a no further action is anticipated. Ten

groundwater wells will be properly abandoned.

Example 1 Alternate MFR: RACER Estimate with MFR and no Supporting Documentation (continued)

4. Cost Estimate Calculation Summary

See RACER .mdb file for cost estimate calculations. (If only using RACER to generate cost estimate, a calculation summary is not required. However, if a combination of RACER and other supporting documents are used to generate the cost estimate, the calculation summary must be completed as per example 4b.)

Memo prepared by: Bubba Bender (888)555-1212 Bubba Bender 10/3/05
SIGNATURE DATE

Memo reviewed by: Betty Boss (888)555-1212 Betty Boss 10/3/05
SIGNATURE DATE

POST FS/DD

Scenario 2: Estimates Developed with Site Documents

The Recommended Alternative from: FS, CMS, DD, ROD, or Engineering Evaluation/Cost Analysis (EE/CA) must be used to generate the estimate beyond the investigative phase. Regardless of the estimate source selected, the estimator must be able to show an audit trail from the site document to the CTC estimate in the MFR. The supporting documents must be uploaded in the Army database of record and also be maintained in the CTC estimate file.

Installations must adjust historical costs to current year dollars where required. OMB factors to escalate prior year dollars to current year dollars will be provided annually on AERO for CONUS installations. Overseas installations must contact their Resource Management office for country-specific escalation and currency conversion factors. Out year costs must be reported in current year dollars and must NOT be escalated.

Example 2a—Estimate Developed with CMS

Site FTIRP-30 is approximately 350 acres. It includes the old and new TNT production facilities, a red water treatment plant, and an industrial surface water pollution control facilities. Limited disposal occurred at the site. Initial remedial investigation results indicated high levels of explosives in soil, sediment and groundwater over regulatory limits. Additional contaminants include arsenic, lead, Polychlorinated Biphenyls (PCBs) and PAHs. The CMS for the site conducted in January 2005 indicated that 43,300 cubic yards of explosives-, PCB- and metals-contaminated soils required removal. The CMS recommended alternative was excavation of contaminated soil with on-site, ex situ stabilization and transport off-site for final treatment and disposal.

The required documentation for upload to the database of record for the CTC estimate is:

1. MFR (see attached)
2. Supporting Documentation (see attached),
   Cover page CMS Report,
   Page 3-13 to 3-15 CMS Report—identifying the recommended alternative,
   Table 2-2 RA—Quantity 43,300 yd^3, and
   Table 4-1 CMS Cost Estimate

Example 2a—Estimate Developed with CMS

DEPARTMENT OF THE ARMY
Fort IRP
12345 ARMY HIGHWAY 27
BUMBANK, MN 12345-6789
30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Site FTIRP-30

1. This memorandum serves as formal documentation of the information used to develop the CTC estimate for FTIRP-30.

2. Background information, strategy, and assumptions. Site FTIRP-30 is located in the north central portion of the plant and is approximately 350 acres. It includes the old and new TNT production facilities, Red Water Treatment Plant, and the Industrial Surface Water Pollution Control Facilities. Limited disposal occurred at the site. Contamination is believed to be primarily the result of spills during production. Initial remedial investigation results indicated high levels of explosives in soil, sediment and groundwater. Additional contaminants include arsenic, lead, PCBs and PAHs. The Corrective Measures Study (CMS) for the site was approved in January 2005 and indicated that 43,300 cubic yards of explosives-, PCB- and metals-contaminated soils required removal. The Statement of Basis was approved in March 2005. The CMS recommended alternative was Alternative 1, excavation of contaminated soil with on-site, ex situ stabilization and transport off-site for final treatment and disposal. Delineation and removal actions are underway and will be completed in FY07. Land use controls for industrial reuse will follow. Groundwater contamination, saturated zone soils and long-term management will be addressed under an adjacent site.

3. A 30% contingency from the CMS to allow for additional soil removal, treatment, disposal and sampling as used to calculate the estimate.

4. Parameters: Approximately 43,300 cubic yards of soil will be excavated (Table 2-2). The unit cost and cost elements are identified in Table 4-1. Contractor profit and project management fees are shown in the estimate. There are no project changes or cost adjustments.

5. Cost Estimate Calculation Summary

   Total cost (present value) for Alternative 1= $13,500,000
   a. FY06 CMI (C) Cost: $12, 300,000 x 1.015 = $12,484,500 FY06$
   Note: enter $12,485K under CMI (C) phase
   b. FY06 LTM Costs: $1,200,000 x 1.015 = $1,218,000/30years = $40,600/yr
   Note: enter $41K under LTM phase per year for 30 years

Estimate prepared by: John Brown (757) 124-4567 John Brown 10/3/05
SIGNATURE DATE

Estimate reviewed by: Hank Jones (757) 124-4567 _ Hank Jones 10/3/05
SIGNATURE DATE

Example 2a—Estimate Developed with CMS (continued)

Final

Soil Corrective Measures Study
TNT Manufacturing Valley
and
Redwater Treatment Plant Area
Site FTIRP-30

Fort IRP
Bumbank, MN

Prepared for

U.S. Army Corps of Engineers
123 First Street
Bumbank, MN

and

Fort IRP
Bumbank, MN

Prepared by

Environmental Consulting
123 Little Street
Minneapolis, MN

Contract No. DACA21-234-D055
January 2005

Example 2a—Estimate Developed with CMS (continued)

3.3.1 Alternative 1 – On-Site Ex Situ Stabilization and Off-Site Disposal

This alternative involves excavation, on-site treatment, and off-site disposal of all contaminated soils and sediments that exceed PRGs. Under this alternative, treated soils containing explosives, metals, PAHs, and PCBs (less than 50 ppm) would be stabilized on site prior to off-site disposal.

Excavation of soil and sediment up to 20 feet below ground surface would be accomplished by using conventional earth-moving equipment, including backhoes, bulldozers, graders, and front-end loaders. It is assumed that the existing roads at the TNT Manufacturing Valley area are adequate to provide access for heavy equipment and dump trucks to all areas requiring excavation. Removal of rubble and structures and clearing/grubbing of vegetation would be required to gain access to the areas to be excavated.

All excavation and sediment removal activities would be performed using standard health and safety practices in order to minimize airborne particle generation and exposure pathways that might place workers at risk. Particulate air monitoring would be conducted downwind of the work areas to determine if airborne emissions exceed acceptable levels.

Soil in the remediation areas will be excavated and trucked to the staging area to screen oversize material (e.g., rocks). The screened soil will be stockpiled at the staging area for subsequent stabilization or disposal. Soil adhering to the oversize material will be removed so that the oversize material can be returned to the excavation.

Following excavation of the contaminated soil, representative soil samples from each area would be laboratory analyzed for disposal profiling. Estimated quantities of soils organized according to type of contamination are provided in Table 2-2. Soil that passes the TCLP tests can be disposed in a landfill as nonhazardous waste. The remaining hazardous soil would be stabilized prior to profiling and disposal. For purposes of cost estimating for this CMS, it is assumed that all soil will require stabilization prior to disposal at a Subtitle D landfill.

Example 2a—Estimate Developed with CMS (continued)

The staging areas for excavated soil and sediment would be located within the TNT Manufacturing Valley. The staging area would be strategically placed to maximize access to roadways and to minimize the clearing/grubbing of vegetation. The contaminated material stockpile/staging area would be designed, constructed, and operated in accordance with the requirements set forth in 40 CFR 264.554, Staging Piles. The stockpile would be partitioned into individual cells so that soil/sediment groups containing a particular contaminant (i.e., explosives, metals, PAHs, or PCBs) or any combination of contaminants would be staged in individual cells by contaminant type if possible. The stockpile would be covered at the end of each work day or when precipitation is anticipated to minimize leachate generation and wind dispersion.

Chemical stabilization would be used to treat the excavated soil classified as hazardous waste. A stabilization treatability/optimization study would be completed prior to full-scale implementation to identify the most cost-effective stabilization agents for the COCs in soil. The treatability study would also specify the stabilization mix recipe (mass ratio of reagents to soil) for the range of contaminant concentrations that are anticipated, based on the soil data. For cost-estimating purposes to complete this CMS, it is assumed that portland cement would be used to stabilize metals and activated carbon would be used for explosives. Soils containing metals that are commingled with low concentrations of PCBs (less than 50 ppm) would also be stabilized with portland cement prior to off-site disposal. Properly permitted Subtitle D landfills can accept soils containing PCBs at prestabilization concentrations of less than 50 ppm.

The assumed mass ratio of cement in the stabilization mix is 8 percent. The ratio of activated carbon in the stabilization mix is 2 percent. These ratios are considered to be conservative, and the actual amounts of cement and activated carbon required could be less or more.

During full-scale remediation, the stabilization reagent would be mixed with the soil using a pug-mill to stabilize the chemical contaminants, thereby decreasing the mobility of the COCs in the stabilized waste matrix. The process rate for stabilizing the soil is approximately 800 tons per day. Stabilization is not dependent upon a warm climate and can be performed throughout the year

After the soil is stabilized, the mixture would be segregated into 400-ton stockpiles. A 10-point composite sample of the stabilized soil would be taken from each stockpile. The samples would be tested for hazardous characteristics using the TCLP test. If the soil tests nonhazardous and complies with the land disposal restrictions (LDR), it would be disposed in a nonhazardous

Example 2a—Estimate Developed with CMS (continued)

waste landfill. If the soil tests hazardous or does not comply with LDRs, it would be reprocessed until it complies with regulatory requirements for nonhazardous disposal.

It is important to understand that stabilization does not reduce the concentrations or transform the COCs in the soil; it only alters the physical availability of contaminants. Therefore, it is not recommended that the stabilized soil be used as fill material for a site to be released for unrestricted use. Instead, the stabilized soil would be disposed of in a nonhazardous waste landfill, potentially used as daily cover by the landfill.

Excavated areas would be backfilled with clean fill, compacted, graded, and reseeded as required.

In general, special conditions may have to be met in order for a particular TSDF to accept a given waste. These conditions would vary depending on the facility and the state in which the facility is located and may include but may not be limited to the following:

- Complete chemical composition of the waste may have to be provided prior to acceptance.
- All waste loads must be accompanied by an appropriate manifest and any required LDR forms.
- Waste may have to meet certain characteristic criteria (e.g., waste must pass the paint filter test, may not contain certain materials, debris may not exceed a certain size or contain certain materials).
- Waste must comply with local, state, and federal regulations, as well as the site's permit requirements.

Excavated soil/sediment staged on the RCRA staging pile would, through gravity drainage, most likely be sufficiently dewatered to pass the EPA paint filter test, which is usually required prior to landfill disposal.

Example 2a—Estimate Developed with CMS (continued)

Table 2-2

Estimated Soil Volumes Requiring Remediation
TNT Manufacturing Valley Corrective Measures Study

(Page 1 of 2)

No.	Building Number	Area of Soil to be Removed (square feet)	Average Depth of Excavation (feet)	Volume of Soil According to Constituents (cubic yards)							Volume of Soil to be Remediated (cubic yards)
				1	2	3	4	5	6	7	
				Nitros & PAHs	Nitros PAHs & Arsenic	Arsenic	Arsenic and PCBs < 50 ppm	Arsenic and Lead	Arsenic, Lead, Nitros, PCBs < 50 ppm	Nitros & PAHs, Arsenic and Lead	
1	801-1	1,730	9	367	207	7					581
2	801-2	850	10	17	17	296					330
3	801-3	825	14	11		425					436
4	801-4	2,250	10	7	311	550					869
5	801-5	2,130	11	315	519						833
6	801-6	1,775	17	833	296						1,130
7	801-13	400	14		207						207
8	802-1	650	2		26	22					48
9	802-2	4,950	20	3,500	167						3,667
10	802-3	4,950	18	3,150			83				3,233
11	802-4	8,100	13	3,486	249	267			40		4,042
12	802-5	960	2	44		27					71
13	802-6	6,075	17	67	3,733						3,800
14	802-11	225	17			142					142
15	802-14	225	19			158					158
16	802-15	1,125	2	65	19						83
17	802-16	225	20			167					167
18	803-1	595	14	14		296					311
19	803-2	850	9	269		17					285
20	803-3	995	6	27	163	17					207
21	803-4	1,914	4	189		83					272
22	803-5	1,584	10	41	267	269					577
23	803-6	800	20	593							593
24	803-11	1,200	2	44	44						89
25	803-13	400	20	296							296
26	803-14	400	20			296					296
27	803-15	400	2	30							30
28	803-16	400	20		296						296
29	806-1	9,925	2	676	59						735
30	806-2	1,365	2	101							101
31	806-3	700	2	52							52
32	806-4	15,050	2	1,333							1,333
33	806-5	2,525	2	170	17						187
34	806-6	4,975	2	272	96						369
35	806-12	225	2			17					17
36	806-15	225	2			17					17
37	808-1	300	2	15	7						22
38	808-2	725	2	37		17					54
39	808-3	3,050	2	226							226
40	808-7	300	2	15	7						22
41	812-1	6,000	4		889						889
42	812-2	7,500	5			167				1,222	1,389
43	812-3	6,600	9	2,200							2,200
44	812-7	900	10	326							326
45	817-2	800	7			217					217

Example 2a—Estimate Developed with CMS (continued)

Table 2-2

Estimated Soil Volumes Requiring Remediation
TNT Manufacturing Valley Corrective Measures Study

(Page 2 of 2)

				Volume of Soil According to Constituents (cubic yards)							
				1	2	3	4	5	6	7	
No.	Building Number	Area of Soil to be Removed (square feet)	Average Depth of Excavation (feet)	Nitros & PAHs	Nitros PAHs & Arsenic	Arsenic	Arsenic and PCBs < 50 ppm	Arsenic and Lead	Arsenic, Lead, Nitros, PCBs < 50 ppm	Nitros & PAHs, Arsenic and Lead	Volume of Soil to be Remediated (cubic yards)
46	BL 13-16 Ditch	1,800	3	67		133					200
47	West TNT Ditch	12,350	2	157	867	116					1,140
48	RWTP	82,645	3	6,488		1,500		363			8,351
49	North TNT Area	5,079	12	100		2,244					2,345
	TOTALs	**210,022**	**9**	**25,600**	**8,500**	**7,500**	**100**	**360**	**40**	**1,200**	**43,300**

TOTALS SUMMARY

Constituents	No.	Volume (cubic yards)
Nitros & PAHs	1	25,600
Nitros PAHs & Arsenic	2	8,500
Arsenic	3	7,500
Arsenic and PCBs < 50 ppm	4	100
Arsenic and Lead	5	360
Arsenic, lead, nitros, PCBs < 50 ppm	6	40
Nitros & PAHs, Arsenic and Lead	7	1,200
TOTAL		**43,300**

Notes:
Blank boxes under columns for "Volume of Soil Acccording to Constituents" equals zero volume.
BL = Batch Line
Nitros = Nitroaromatics
PAH = Polyaromatic Hydrocarbon
PCB = Polychlorinated Biphenyls
RWTP = Red Water Treatment Plant
TNT = Trinitrotoluene

Example 2a—Estimate Developed with CMS (continued)

Table 4-1. Alternative Cost Summary for Corrective Measures Study
TNT Manufacturing Valley
Fort IRP

Task Description	Unit Cost	Estimate
Bench-Scale Study, Work Plans, Health and Safety Plan, Materials List, and Procurement	1LS	$64,000
Mobilization of Equipment and Personnel	1LS	$31,000
Site Preparation	1LS	$220,000
Structure Demolition and Debris Removal & Disposal (includes particulate air monitoring)	1LS	$800,000
Lateral & Vertical Extent Soil Sampling & Analysis	1LS	$200,000
Excavation of Contaminated Soil (includes required monitoring)	17/yd^3	$700,000
Chemical Stabilization of Explosives and Metals-Contaminated Soil	66/yd^3	$2,860,000
Off-Site Disposal	51/yd^3	$2,210,000
Site Restoration/Backfill Excavation with Clean Soil/Demob	1LS	$1,210,000
Subtotal Capital Cost		$8,295,000
Contingency	30%	$2,489,000
Contractor PM	7.5%	$622,000
Fee/Profit	10%	$830,000
Total Capital Cost		$12,300,000
Present Value of 30 yrs LTM	40	$1,200,000
Total Present Value Cost		$13,500,000

3-18

Example 2b—Estimate Developed with CMS

Site FTP-333. The area was used as a fuel storage and dispensing facility from the late 1940s to the mid-1980s. During removal of three USTs in 1985, a leak was discovered and petroleum odor was reported in a spring located down gradient from the site. A PA was performed and a product recovery and containment program was initiated. IRAs included free-product recovery and a groundwater treatment system installed in 1992. Contaminated groundwater discharged to a stream caused surface water and sediment contamination. The Final CMS was approved April 2004. The Decision Document was signed in 2004. The cleanup strategy (RD/RA) includes soil vapor extraction/bioventing/aquifer air sparging (SVE/BV/AAS) in source area and excavation of contaminated soil and sediment. After the contaminant source is remediated, the system will operate [RA(O)] to FY14. MNA will be conducted to FY25 followed by LTM until FY45. Site closeout will occur after LTM.

The required documentation for upload to the database of record for the CTC estimate is:

1. MFR (see attached)
2. Supporting Documentation (see attached),

   Cover page CMS Report,

   Executive Summary RA—Quantity 22,300 yd^3 of soil/sediment for excavation and disposal; 39 sparge wells; 51 SVE/BV wells,

   CMS Report—identifying the recommended alternative, and

   Selected Alternative 5 CMS cost estimate tables.

Example 2b—Estimate Developed with CMS

DEPARTMENT OF THE ARMY

Fort Cleanup
12345 ARMY HIGHWAY 27
FORT CLEANUP, NEW MEXICO 12345-6789

30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Site FTP-333

1. This memorandum serves as formal documentation of the information used to develop the CTC estimate for FTP-333.

2. Background information and strategy. The area was used as a fuel storage and dispensing facility from the late 1940s to the Mid-1980s. During removal of three USTs in 1985, a leak was discovered and petroleum odor was reported in a spring located down gradient from the site. A PA was performed and a product recovery and containment program was initiated. IRAs included free-product recovery and a groundwater treatment system installed in 1992. Contaminated groundwater discharged to a stream caused surface water and sediment contamination. The Final CMS was approved April 2004. The Decision Document was signed in 2004. The cleanup strategy (RD/RA) includes SVE/BV/AAS in source area and excavation of contaminated soil and sediment. After the source is removed and the system installed, the system will operate [CMI(O)] to FY14. It will be followed by MNA will be conducted to FY25 followed by LTM until FY45. Site closeout will occur after LTM.

3. Parameters: Approximately 22,300 (12,000 + 10,300) cubic yards of soil will be excavated, dewatered and disposed offsite (see item 5.3 in Alternative 5 Table). The unit cost and cost elements are identified in Alternative 5 Table. Contractor profit and project management fees are shown in the estimate. There are no project changes or cost adjustments. The costs were escalated from 2003 to 2006 dollars.

4. Cost Estimate Calculation Summary

Total cost for Alternative 5 in 2003 dollars= $4,530,359
Total cost for Alternative 5 in 2006 dollars= ($4,530,359) x (escalation factor of 1.0416) = $4,718,822.

a. FY06 CMI (C) Cost: $1,740,179 x 1.0416 = $1,812,570
Note: enter $1,813K under CMI (C) phase as a first year cost
b. FY06 CMI (O) Cost for the SVE/BV/AAS system: $1,069,880 x 1.0416 = $1,114,387 = $159,198/yr
Note: enter $159K under CMI (O) phase for years 2 through 8
c. FY06 CMI (O) Cost for MNA: $1,034,000 x 1.0416 = $1,077,014 = $107,701/yr
Note: enter $108K under CMI (O) phase for years 9 through 18
d. FY06 LTM Costs: $686,300 x 1.0416 = $714,850/20 years = $35,743/yr
Note: enter $36K under LTM phase per year for years 19 through 39

Estimate prepared by: John Brown (757) 124-4567 John Brown 10/3/05
SIGNATURE DATE

Estimate reviewed by: Hank Jones (757) 124-4567 Hank Jones 10/3/05
SIGNATURE DATE

Example 2b—Estimate Developed with CMS (continued)

Environmental Consulting

Final

Corrective Measures Study

Site FTP-333

Gasoline Gulley, Fort Cleanup, New Mexico

U.S. Army Corps of Engineers

July 2003

Example 2b—Estimate Developed with CMS (continued)

EXECUTIVE SUMMARY

This Corrective Measures Study identifies and evaluates corrective measure alternatives based upon the results of previous and ongoing investigations that examined subsurface site conditions. Subsurface investigations indicated that petroleum-impacted soil is present within the vadose zone in the area of the former underground storage tanks and in the vicinity of the fuel dispenser pad. Residual hydrocarbon contamination at each of these areas extends down to the water table. The data also indicated that petroleum-impacted soil is present at the water table interface and extends approximately 550 ft hydraulically downgradient in a northwest direction to the surface water impoundment. The estimated volume of subsurface soil targeted for corrective action is 12,000 yd^3 in the source area and 10,300 yd^3 adjacent to the source area for a total of 22,300 yd^3. A dissolved-phase groundwater plume extends at least 1,000 ft northwest of the source area.

The media targeted for remediation includes subsurface soil, groundwater, surface water, and sediment. As required by the State Department of Environment, the primary corrective action objectives (CAOs) will be to remediate the site to the extent practicable (i.e., technologically and fiscally feasible) to the following media cleanup criteria:

- **Surface and Subsurface Soil**—Achieve criteria presented in State, Determination of Soil Cleanup Objectives and Cleanup Levels,
- **Groundwater**—Achieve State groundwater standards for constituents of concern (COCs) in groundwater state,
- **Surface Water**—Achieve State surface water standards for COCs in surface water, and
- **Sediment**—Achieve the criteria set forth in the State Technical Guidance for Screening Contaminated Sediments.

The goal of this Corrective Measures Study was to develop, screen, and evaluate potential corrective measure alternatives for the site that are protective of human health and the environment and are capable of meeting the CAOs.

Following the establishment of CAOs, general corrective actions for the site were developed to meet the CAOs by either reducing the containment concentration in each medium below the required cleanup value or by preventing exposure to the contaminated medium by the receptor of concern. For the listed medium, the general corrective actions considered were no action, institutional controls, *in situ* and *ex situ* treatment technologies, removal and disposal, and containment.

Technologies that have demonstrated promise in remediation of sites with conditions similar to those encountered at the site were assembled and screened for feasibility against the short-term and long-term aspects of three broad criteria: (1) effectiveness, (2) implementability, and (3) cost.

Example 2b—Estimate Developed with CMS (continued)

The following technologies warranted further consideration as corrective measure alternatives and were retained after screening: (1) no action, (2) monitoring, (3) site use restrictions, (4) natural attenuation, (5) soil vapor extraction, (6) bioventing, (7) aquifer air sparging, (8) chemical oxidation, (9) reactive wall, (10) air stripping, (11) soil vapor treatment via oxidation, and (12) excavation.

Based upon the CAOs and technology screening process, the following corrective measure alternatives were developed for soil, sediment, surface water, and groundwater:

- **Alternative 1**—No Action
- **Alternative 2**—Chemical Oxidation, Reactive Wall, Natural Attenuation, Environmental Land Use Restriction, and Tiered Monitoring
- **Alternative 3**—Chemical Oxidation, Aquifer Air Sparging, Excavation, Natural Attenuation, Environmental Land Use Restriction, and Tiered Monitoring
- **Alternative 4**—Soil Vapor Extraction/Bioventing, Reactive Wall, Excavation, Natural Attenuation, Environmental Land Use Restriction, and Tiered Monitoring
- **Alternative 5**—Soil Vapor Extraction/Bioventing, Aquifer Air Sparging, Excavation, Natural Attenuation, Environmental Land Use Restriction, and Tiered Monitoring.

A detailed and comparative analysis of the individual corrective measure alternatives was conducted with respect to the following five standards:

1. Protection of human health and the environment
2. Attainment of media cleanup standards and compliance with applicable or relevant and appropriate requirements
3. Control of the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment
4. Compliance with applicable standards for management of wastes, and
5. Other factors.

Included under other factors were the following five decision factors, which were used in selecting the final corrective measure:

1. Long-term reliability and effectiveness
2. Reduction of toxicity, mobility, and volume of contaminants
3. Short-term effectiveness
4. Implementability
5. Cost.

Alternative 1 does not meet any of the CAOs. Alternative 2 meets the CAOs, but does not comply with the short-term effectiveness criteria for sediment because natural attenuation is the only remedy presented. Alternatives 3 through 5 meet the CAOs, and comply with the evaluation criteria presented in Chapter 5. Alternative 5 was recommended over Alternatives 3 and 4 because it is considered to be more comprehensive, efficient, and cost effective than Alternatives 3 and 4.

Example 2b—Estimate Developed with CMS (continued)

Alternative 5 consists of the following components:

- *In situ* physical remediation of COCs in subsurface soil (soil vapor extraction/bioventing) and *ex situ* physical treatment of COCs in soil vapor (catalytic/thermal oxidation/granular activated carbon filtration of extracted soil vapor)
- *In situ* physical remediation of COCs in groundwater and surface water (aquifer air sparging)
- *Ex situ* physical remediation of COCs in sediment (excavation)
- Natural attenuation of downgradient subsurface soil and surface water
- Tiered monitoring
- 5-year reviews by Fort Cleanup and the State.

Alternative 5 was selected over Alternatives 3 for the following reasons:

- Capital costs associated with chemical oxidation and a small-scale AAS system are significantly higher than the capital costs for installation of both a SVE/bioventing and large-scale AAS system.
- Operation and maintenance costs for the SVE/bioventing and large-scale AAS systems are not significantly higher than operation and maintenance costs for the small-scale AAS system.

Alternative 5 was selected over Alternative 4 for the following reasons:

- Capital costs for installing a large-scale AAS system are not significantly higher than installing a single reactive wall.
- Operation and maintenance costs for operating a large-scale AAS system are equivalent to operation and maintenance costs for a single reactive wall.
- A large-scale AAS system will remediate impacted groundwater faster than a single reactive wall, which will result in lower total remediation costs.

Alternative 5 consists of the following components and objectives:

- *In situ* physical remediation of COCs in subsurface soil and *ex situ* physical treatment of COCs in soil vapor (catalytic/thermal oxidation/GAC filtration of extracted soil vapor).

  SVE would be implemented initially to remediate the bulk of the vadose zone contamination. As concentrations of COCs in the extracted soil vapor decrease, the flow rate will be decreased and bioventing will be applied. A short-term pilot study would be conducted in order to obtain design parameters for use of SVE/bioventing at the site, and to determine whether the location and number of proposed wells would be sufficient. In addition, the data would provide site-specific information necessary for system design. An estimated 51 SVE/bioventing wells would be installed at the site.

Example 2b—Estimate Developed with CMS (continued)

It is anticipated that two positive-displacement blowers would be used to recover soil vapor from the extraction wells. It is anticipated that initially, an oxidizer unit would be required for the treatment of extracted soil vapor. The vapor treatment would be converted to activated carbon when concentration of COCs permitted.

- *In situ* physical remediation of COCs in groundwater and surface water.

  AAS would be used across the impacted aquifer (from the source area to the surface water impoundment) to volatilize dissolved-phase VOCs from the groundwater, and transfer oxygen into the groundwater. A short-term pilot study would be conducted in order to obtain design parameters for use of AAS at the site, and to determine whether the location and number of proposed wells would be sufficient. In addition, the data would provide site-specific information necessary for system design. An estimated 39 AAS wells would be installed at the site.

  The air sparging system would consist of a blower, pressure gauges, air flow meters, and air flow control valves. The system would use vertical sparge wells, with multiple lines of sparge wells transecting the dissolved-phase plume.

- *Ex situ* physical remediation (excavation) of COCs in sediment.

  When the concentrations of COCs in soil, groundwater, and surface water approach predetermined levels, sediment excavation will be implemented, if required. If monitoring of sediment prior to implementation of the second phase indicates that natural attenuation is effectively reducing COCs in sediment, then excavation of sediment may not be necessary. In the event that natural attenuation has not been effective in reducing COCs in the sediment, excavation would be implemented beginning with a pre-design investigation to delineate the extent of the remaining impacted sediment and to determine the volume of sediment to be removed. Based on previous investigations at the site as well as the surface water impoundment reconstruction activities, a conservative estimated volume of 2,000 yd^3 will be used for costing purposes.

- Tiered monitoring

  COC concentrations and potential risks at the site would be evaluated through a tiered monitoring program similar to the groundwater monitoring program currently being conducted at the site. However, the scope of the monitoring program would be expanded to evaluate the effectiveness of SVE/AAS for reducing COC concentrations in both soil and groundwater, and excavation for reducing COC concentration in surface water and sediment. In addition, monitoring would be conducted to assess the rate at which natural attenuation processes are occurring at the site. Once baseline conditions have been established, the monitoring program would be flexible in that the scope could be revised annually and/or during 5-year reviews based on the analytical data collected from the previous sampling events. The monitoring program would be conducted so long as *in situ* remediation is being

Example 2b—Estimate Developed with CMS (continued)

conducted and COCs are present above acceptable media cleanup goals or risk-based concentrations. If groundwater/surface water sampling results indicate that COCs continue to leach from soil to groundwater, or from groundwater or sediment to surface water, then the scope and frequency of the monitoring program can be expanded or additional risk assessment or corrective actions can be taken.

- 5-year reviews by Fort Cleanup and State.

  Fort Cleanup and State would conduct 5-year reviews as long as COCs remain on-site above concentrations that allow for unrestricted use and unlimited exposure. The 5-year reviews would focus on the data from the *in situ* and *ex situ* remediation and tiered monitoring program as well as the future site use (anticipated to remain an active army installation). The site review would evaluate the site status to determine whether continued remediation, modifications to the recommended alternative, or additional action is necessary.

Example 2b—Estimate Developed with CMS (continued)

Alternative 5: Soil Vapor Extraction/Bioventing, Aquifer Air Sparging, Excavation, Natural Attenuation, Tiered Monitoring, and Environmental Land Use Restriction

A. CAPITAL COSTS

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity (a)	Total Cost
1	**Monitored Natural Attenuation**				
	Covered under Section B - Operation & Maintenance - Items 1.1 - 2.4				
2	**Land Use Restriction**				
2.1	Site-specific use plan	Administer activities at site	$8,000	1	$8,000
2.2	Land use restriction	Declaration of environmental restriction to prevent groundwater and soil use.	$10,000	1	$10,000
	Subtotal				$18,000
2.3	Contingency	--	--	25%	$4,500
	Line item total				$22,500
3	**SVE/Bioventing**				
3.1	SVE Pilot Test	Includes rental of vacuum pump and equipment	$20,000	1	$20,000
3.2	Install Extraction Wells	Includes well installation and connection to SVE header (EA)	$2,500	51	$127,500
3.3	Trenching for SVE Piping	Includes mob, demob, trenching, Piping, and backfilling (LF)	$45	3225	$145,125
3.4	Vacuum Blower Purchase and Installation	Includes purchase and install of SVE blower (EA)	$25,000	2	$50,000
3.5	Additional System Components	Includes purchase and installation of air-water separator, groundwater pump, additional controls (EA)	$15,000	1	$15,000
3.6	Treatment System Building Modification	Modification to existing system building to house additional equipment	$10,000	1	$10,000
3.7	Off-gas Treatment	Includes purchase and installation of catalytic/thermal oxidation units	$40,000	1	$40,000
3.8	Engineering design	10% of System cost		10%	$40,762.50
3.9	Mobilization, demobilization, construction management, permitting, and site services related to system installation	5% of System cost		5%	$20,381
	Subtotal				$468,769
3.10	Contingency	--	--	25%	$117,192
	Line item total				$585,961
4	**Aquifer Air Sparging**				
4.1	Air Sparge Pilot Test	Includes rental of blower and equipment	$20,000	1	$20,000
4.2	Sparge Well Installation	Includes installation of 39 sparge wells (EA)	$2,000	39	$78,000
4.3	Trenching for Sparge Piping	Includes mob, demob, trenching, Piping, and backfilling (LF)	$45	800	$36,000
4.4	Air Sparge Blower Purchase and Installation	Includes the purchase of blower, installation, and electrical connections	$25,000	3	$75,000
4.5	Engineering design	10% of System cost		10%	$20,900.00
4.6	Mobilization, demobilization, construction management, permitting, and site services related to system installation	5% of System cost		5%	$10,450.00
	Subtotal				$240,350
4.7	Contingency	--	--	25%	$60,088
	Line item total				$300,438
5	**Excavation**				
5.1	Pre-design Investigation	Surface soil/sediment sampling to delineate area of excavation	$50,000	1	$50,000
5.2	Clearing-Grubbing	Clearing, grubbing, and site work preparation for excavation	$40,000	1	$40,000
5.3	Excavation	Excavation, dewatering, disposal, and analytical.	$250,000	1	$250,000
5.4	Backfill and Stream Restoration	Replace excavated soil and restore stream banks.	$275,000	1	$275,000
5.5	Engineering design, Sediment and Erosion Control Plan	15% of Removal cost		15%	$51,000.00
5.6	Mobilization, demobilization, construction management, and permitting	5% of Removal cost		5%	$17,000.00
	Subtotal				$683,000
5.7	Contingency	--	--	25%	$170,750
	Line item total				$853,750
	Total Capital Costs				**$1,790,148**

Example 2b—Estimate Developed with CMS (continued)

B. OPERATION AND MAINTENANCE (O&M) COSTS

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity/ annum (#)	Total Cost
1	**Quarterly GW Monitoring (Years 1 - 3)**				
1.1	Sample collection - labor and equipment costs	Sample 20 existing wells 4 times a year	$360	80	$28,800
1.2	Analytical Costs - VOCs & Natural Attenuation	Analyses of groundwater samples for COCs	$270	80	$21,600
1.3	Reporting	Quarterly report to regulators	$10,000	4	$40,000
1.4	Sampling preparation, mobilization, and demobilization	For each sampling event	$2,500	4	$10,000
	Annual O&M Cost:				**$100,400**
2	**Annual GW Monitoring (Years 4 - 30)**				
2.1	Sample collection - labor and equipment costs	Sample 8 existing wells once a year	$360	8	$2,880
2.2	Analytical Costs - VOCs & Natural Attenuation	Analyses of groundwater samples for COCs	$270	8	$2,160
2.3	Reporting	Annual report to regulators	$15,000	1	$15,000
2.4	Sampling preparation, mobilization, and demobilization	For each sampling event	$2,500	1	$2,500
	Annual O&M Cost:				**$22,540**
3	**Treatment System O&M (Years 1-30)**				
3.1	Operation of Treatment System	Labor	$40,000	1	$40,000
3.2	Supervision of Treatment System	Labor	$15,000	1	$15,000
3.3	Utilities	Electricity, fuel, etc.	$4,000	12	$48,000
3.4	Sample collection - labor and equipment costs	Sample collection and shipping	$350	12	$4,200
3.5	Analytical costs	Monthly sampling	-	-	-
3.5.1	VOCs (Soil Vapor)	Monthly influent and effluent sampling	$170	24	$4,080
3.5.2	TPHs (Soil Vapor)	Monthly influent and effluent sampling	$40	24	$960
3.6	Reporting	Monthly reports to regulators	$2,000	12	$24,000
3.7	Sampling preparation, mobilization, and demobilization	For each sampling event	$300	12	$3,600
3.8	Propane	Fuel for oxidizer units	$3,000	1	$3,000
3.9	System repair and replacement	Monthly maintenance (LS)	$10,000	1	$10,000
	Annual O&M Cost:				**$152,840**
4	**Annual Progress Meetings**				
4.1	Meetings	Meet once a year for 30 years	$2,500	1	$2,500
4.2	Travel	Travel to the meeting site	$500	1	$500
	Annual Meeting Cost:				**$3,000**
5	**Five-Year Review Meeting**				
5.1	Meetings	Meet once every 5 years for 30 years	$5,000	6	$30,000
5.2	Travel	Travel to the meeting site	$500	6	$3,000
5.3	Reports	One report every 5 years	$20,000	6	$120,000
	Line Item Total				$153,000
	5-Year Review Cost:				**$5,100**

Example 2b—Estimate Developed with CMS (continued)

Alternative 5 Cost Summary

Phase	Type	Unit Cost	Number of Years	Total Cost
RA(C)	SVE/BV	$585,961	1	$585,961
	AAS	$300,438	1	$300,438
	Excavation	$853,780	1	$853,780
Subtotal				**$1,740,179**
RA(O)	Operation	$152,840	7	$**1,069,880**
Subtotal				
RA(O)	(4-GW monitoring wells)	$100,400	10	$1,004,000
Annual progress meeting		$3,000	10	$30,000
Subtotal				**$1,034,000**
LTM	Annual	$22,540	20	$450,800
LUC		$22,500	1	$22,500
5-year review meeting		$25,500	6	$153,000
Annual progress meeting		$3,000	20	$60,000
Subtotal				**$686,300**

Phase	Total FY03 Costs	Escalation Factor	Total FY06 Costs	Annual Costs
RA(C)	$1,740,179	1.0416	$1,812,570.45	
RA(O)	$1,069,880	1.0416	$1,114,387.01	$159,198.14
RA(O)	$1,034,000	1.0416	$1,077,014.40	$107,701.44
LTM	$686,300	1.0416	$714,850.08	$35,742.50
Total	$4,530,359		$4,718,821.93	

Example 2c—Estimate Developed with Proposal

Site CCFL001. During a UST removal in July 1998, a fuel leak to groundwater was discovered. The follow-up closure assessment confirmed the contamination above regulatory limits. After further delineation, a Remedial Action Plan was developed consisting of several tasks for in situ biodegradation: Baseline groundwater sampling, injection point installation, biodegradation reagent, injection/application, as-built survey, interim groundwater sampling, supplemental injections/applications and final report. The cost estimate is for continued operation of this system for 3 years and closure of the site (well closure and the final report).

Discussion

The Remedial Action Plan is not provided as supporting documentation because a proposal is provided for completing this plan. The proposal is provided in FY05, was bid at the end of the year, and is good for 6 months subject to available funding.

Other types of proposals that may be used as the basis for the estimate include fee schedules provided by the USACE or by U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM).

The required documentation for upload to the database of record for the CTC estimate is:

1. MFR (see below)
2. Supporting documentation (see attached),
   Statement of Work (SOW), and
   Cost Proposal.

Example 2c—Estimate Developed with Proposal

DEPARTMENT OF THE ARMY
Fort IRP
12345 ARMY HIGHWAY 27
Fort IRP, VIRGINIA 12345-6789
30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Site CCFL001.

5. This memorandum serves as formal documentation of the information used to develop the CTC estimate for Fort IRP. This project involves bioremediation. At this point, there has only been one application of biodegradation reagent, and since there has not been enough time to determine if the biodegradation reagent will remediate the site, assumptions were used to develop the CTC estimate.

6. Background Information and strategy:
A fuel leak to groundwater was discovered during tank removals in July 1998. The follow-up closure assessment confirmed the contamination was above regulatory limits. After further delineation, a Corrective Action Plan (CAP) was developed and consisted of several tasks for in situ biodegradation. These tasks include: baseline groundwater sampling, injection point installation, biodegradation reagent, injection/application, as-built survey, interim groundwater sampling, supplemental injections/applications and final report. The cost estimate includes continued operation of this system for 3 years and closure of the site (well closure and the final report).

7. Assumptions: The current contract awarded in FY04, following the approved CAP, will continue through the remainder of FY05 and concludes in June 06. The proposal for future work is provided in FY05 was bid at the end of fiscal year, and is good for 6 months subject to available funding. Site work will include continuation of biodegradation reagent injection applications, quarterly groundwater monitoring, & sampling of ten (10) wells and reporting to the state regulatory agency. In the remainder of FY06, contractor will continue with groundwater monitoring & sampling activities as identified in the CAP. A quarterly report will summarize field and analytical data collected from the quarterly sampling event.

   In FY07, site will require monitoring of groundwater from at least ten (10) wells on a quarterly basis and the required reporting to State Department of Environmental Protection (SDEP). It is assumed that additional application(s) of biodegradation reagent may be necessary due to the restrictive site lithology, the potential for contaminant levels to remain above natural attenuation levels, or rebounding of site contaminant levels.

   It is assumed that in FY08, continuation of groundwater monitoring, sampling and reporting to the state regulatory agency will be required. It is projected that ten (10) site monitoring wells will be sampled during this fiscal year as remediation nears completion. Reporting to

8. state regulatory agency will include four (4) quarterly reports and an annual report which is anticipated to serve as the final remedial action report summarizing all remedial activities performed at the site.

9. Cost Estimate Calculation Summary

Total cost for 3 year contract for CMI (O) $11,000 (FY06) + $71,000 (FY07)+$67,000 (FY08) = $149,000.
This includes $15,000 for site closure costs.

Memo prepared by: Bubba Bender (888)555-1212 Bubba Bender 10/3/05
SIGNATURE DATE

Memo prepared by: Betty Boss (888)555-1212 Betty Boss 10/3/05
SIGNATURE DATE

Example 2c—Estimate Developed with Proposal (continued)

Fort IRP, CAP Implementation
Scope of Work, FY 2006-2008

May 2005

Introduction

A Contamination Assessment and CAP at Fort IRP site CCFL001 have previously been completed and approved by the State Department of Environmental Protection (SDEP). The site remedial action involves the groundwater bioremediation with a biodegradation reagent to treat fuel and its breakdown products. An area of approximately 422,400 cubic feet of facility groundwater at FL001 is known to be contaminated with benzene, toluene, ethyl benzene, total xylenes, naphthalene, 1-methylnapthalene, 2-methylnapthalene, 1,2-dichloroethane, and Total Petroleum Hydrocarbons (TPH). The Contractor shall provide all labor, materials, and equipment necessary to complete the tasks presented below from the SDEP approved CAP for the time period of July 1, 2006 to September 30, 2008.

Site security issues and project working days/hours will be coordinated with the Fort IRP point of contact (POC) for this effort, and standard remediation site practices relative to worker health and safety, decontamination, etc. will be followed. The Contractor will restore the site to as original condition as possible, cleaning up and removing all project related trash, debris, etc.

Description of Tasks

Task 1: Groundwater Monitoring

The Contractor will collect and analyze samples from MW-1 through MW-5, MW-11 through MW-14, and DMW-1 quarterly for ten sampling events during the period of this contract. Analyses of these quarterly samples will be performed for the parameters specified in Section 5.3.1 of the CAP and subsequent SDEP correspondence/directives.

Samples will be collected in accordance with SDEP SOP for Field Activities, dated January 2002 and latest updates, and with the Contractor's Quality Management Plan. Field forms established by SDEP for petroleum cleanups will be used for sampling activities.

Task 2: Reporting and Record Keeping

The Contractor will prepare the following reports under this SOW during the term of this remedial action. Two copies of each report will be submitted to the Fort IRP, one for Fort IRP records retention, and one for forwarding to the SDEP:

1. Ten (10) quarterly reports that summarize field and analytical data collected from the quarterly sampling events. Contaminant contour maps with injection and monitoring well locations and groundwater gradients will be included in these reports.

Example 2c—Estimate Developed with Proposal (continued)

2. Three annual reports (following the quarterly reports) will be prepared as specified in Section 5.4.3 of the CAP, detailing the progress of the remedial action and specifying, as necessary, those report elements listed in this CAP section.

The Contractor will maintain all field and analytical data analyses in its project file, and will summarize analytical data in reports submitted for concise reading.

Task 3: Bioremediation Reagent Injection Re-Applications

A single or multiple application(s) of the biodegradation reagent of equal or less volume than originally used may be necessary under this contract effort. These re-applications may be necessary due to the restrictive site lithology, the potential for contaminant levels to remain above natural attenuation levels, or the rebounding of site contaminant levels. It is not anticipated that wastes requiring sampling or disposal will be generated during this task.

Task 4: Well Closures

Upon successful completion and SDEP approval of the Fort IRP remedial action, all site wells shall be properly closed by a licensed well driller and the site returned to as near its natural condition as possible. Both wells and pads shall be properly closed.

Example 2c—Estimate Developed with Proposal (continued)

The cost proposal is provided in FY05 and was bid at the end of the year and is good for 6 months subject to available funding.

Fort IRP RAP Implementation (CMI (O)), 7/1/06 - 9/30/06									
			SOURCE	COST	LABOR			CATEGORY	TOTAL
	DESCRIPTION	SOURCE	NAME	BASIS	COST	UNITS	QTY.	SUB TOTAL	TASK
Labor	Program Manager	SpecPro Employee			$ 105.67	hour		$ -	
	Sr. Project Manager	SpecPro Employee			$ 98.44	hour	16	$ 1,575.04	
	Regulatory Analyst/Speci	SpecPro Employee			$ 70.60	hour	16	$ 1,129.60	
	Env Information Specialis	SpecPro Employee			$ 52.55	hour	8	$ 420.40	
	Env Technician	SpecPro Employee			$ 45.94	hour	48	$ 2,205.12	
	Subtotal: Direct Labor								$ 5,330.16
				COST	ODC			CATEGORY	TOTAL
	DESCRIPTION			BASIS	RATE	UNITS	QTY.	SUB TOTAL	TASK
ODCs	Well Sampling Supplies			per event	$ 100.00	# of events	2	$ 200.00	
	Per Diem			per day	$ 91.00	days	6	$ 546.00	
	Mileage			GSA rate	$ 0.405	miles	1500	$ 607.50	
	Printing/Binding			per copy	$ 25.00	each	4	$ 100.00	
	Subtotal ODCs								$ 1,453.50
G&A	*Subtotal: General and Administrative*				15.38%				$ 223.55
			SOURCE	COST				CATEGORY	TOTAL
	DESCRIPTION	SOURCE	NAME	BASIS		UNITS	QTY.	SUB TOTAL	TASK
	Laboratory Analysis w/ Q	Subcontractor	Accutest	per event					
	8021				$ 60.00	each	20	$ 1,200.00	
	8011				$ 56.00	each	14	$ 784.00	
	8310				$ 96.00	each	8	$ 768.00	
	FLPRO				$ 84.00	each	4	$ 336.00	
	Duplicates				$ 296.00	each	2	$ 592.00	
									$ 3,680.00
	Subtotal: Subcontractors								$ 3,680.00
M/H	*Subtotal: Material Handling on Subcontractors/Consultants*				3.60%				$ 132.48
G&A on M/H	*Subtotal: General and Administrative Overhead on Material Ha*				15.38%				$ 20.38
	Subtotal: Subcontractor/Consultants with Overheads								$ 3,833.86
									$10,840.06

Example 2c—Estimate Developed with Proposal (continued)

Fort IRP RAP Implementation (CMI(O)), FY 2007									
	DESCRIPTION	SOURCE	SOURCE NAME	COST BASIS	LABOR COST	UNITS	QTY.	CATEGORY SUB TOTAL	TOTAL TASK
Labor	Program Manager	SpecPro Employee			$ 109.37	hour	8	$ 874.96	
	Sr. Project Manager	SpecPro Employee			$ 101.89	hour	200	$ 20,378.00	
	Regulatory Analyst/Specialist	SpecPro Employee			$ 73.07	hour	120	$ 8,768.40	
	Env Information Specialist	SpecPro Employee			$ 54.38	hour	40	$ 2,175.20	
	Env Technician	SpecPro Employee			$ 47.55	hour	120	$ 5,706.00	
	Subtotal: Direct Labor								$ 37,902.56
	DESCRIPTION			COST BASIS	ODC RATE	UNITS	QTY.	CATEGORY SUB TOTAL	TOTAL TASK
ODCs	Well Sampling Supplies			per event	$ 100.00	# of events	4	$ 400.00	
	Per Diem			per day	$ 91.00	days	12	$ 1,092.00	
	Mileage			GSA rate	$ 0.405	miles	3000	$ 1,215.00	
	Printing/Binding			per copy	$ 25.00	each	10	$ 250.00	
	Subtotal ODCs								**$ 2,957.00**
G&A	*Subtotal: General and Administrative*				15.38%				**$ 454.79**
	DESCRIPTION	SOURCE	SOURCE NAME	COST BASIS		UNITS	QTY.	CATEGORY SUB TOTAL	TOTAL TASK
	Laboratory Analysis w/ Q	Subcontractor	Accutest	per event					
	8021				$ 60.00	each	10	$ 600.00	
	8011				$ 56.00	each	7	$ 392.00	
	8310				$ 96.00	each	4	$ 384.00	
	FLPRO				$ 84.00	each	2	$ 168.00	
	Duplicates				$ 296.00	each	1	$ 296.00	
									$ 1,840.00
	COGEN V Re-Application		BioCops		$ 25,000.00	each/lot	1	$ 25,000.00	
	Subtotal: Subcontractors								$ 26,840.00
M/H	*Subtotal: Material Handling on Subcontractors/Consultants*				3.60%				$ 966.24
G&A on M/H	*Subtotal: General and Administrative Overhead on Material H*				15.38%				$ 148.61
	Subtotal: Subcontractor/Consultants with Overheads								$ 27,954.85
Escalation	*5% over FY06 priceson ODCs/Subcontractors*				5.00%				$ 1,568.33
									$70,837.53

Example 2c—Estimate Developed with Proposal (continued)

Fort IRP RAP Implementation (CMI(O)), FY 2008									
			SOURCE	COST	LABOR			CATEGORY	TOTAL
	DESCRIPTION	SOURCE	NAME	BASIS	COST	UNITS	QTY.	SUB TOTAL	TASK
Labor	Program Manager	SpecPro Employee			$ 112.38	hour	16	$ 1,797.76	
	Sr. Project Manager	SpecPro Employee			$ 104.87	hour	200	$ 20,934.00	
	Regulatory Analyst/Specl	SpecPro Employee			$ 76.83	hour	140	$ 10,588.20	
	Env Information Specialis	SpecPro Employee			$ 68.29	hour	40	$ 2,251.60	
	Env Technician	SpecPro Employee			$ 48.22	hour	120	$ 5,906.40	
	Subtotal: Direct Labor								$ 41,477.86
				COST	ODC			CATEGORY	TOTAL
	DESCRIPTION			BASIS	RATE	UNITS	QTY.	SUB TOTAL	TASK
ODCs	Well Sampling Supplies			per event	$ 100.00	# of events	4	$ 400.00	
	Per Diem			per day	$ 91.00	days	12	$ 1,092.00	
	Mileage			GSA rate	$ 0.405	miles	3000	$ 1,215.00	
	Printing/Binding			per copy	$ 25.00	each	10	$ 250.00	
	Subtotal ODCs								$ 2,957.00
G&A	*Subtotal: General and Administrative*				15.38%				$ 464.79
			SOURCE	COST				CATEGORY	TOTAL
	DESCRIPTION	SOURCE	NAME	BASIS		UNITS	QTY.	SUB TOTAL	TASK
	Laboratory Analysis w/ Q	Subcontractor	Accutest	per event					
	8021				$ 60.00	each	20	$ 1,200.00	
	8011				$ 56.00	each	14	$ 784.00	
	8310				$ 96.00	each	8	$ 768.00	
	FLPRO				$ 84.00	each	4	$ 336.00	
	Duplicates				$ 296.00	each	2	$ 592.00	
									$ 3,680.00
	Site Well Closures		Env. Drilling		$ 15,000.00	lot		$ 15,000.00	
	Subtotal: Subcontractors								$ 18,680.00
M/H	*Subtotal: Material Handling on Subcontractors/Consultants*				3.60%				$ 672.48
G&A on M/H	*Subtotal: General and Administrative Overhead on Material Ha*				15.38%				$ 103.43
	Subtotal: Subcontractor/Consultants with Overheads								$ 19,456.91
Escalation	*5% over FY06 priceson ODCs/Subcontractors*				5.00%				$ 1,143.88
Escalation	*5% over FY07 priceson ODCs/Subcontractors*				5.00%				$ 1,200.66
									$65,689.59

Scenario 3: Estimates Developed for Ongoing/Recurring Actions

If two years or more of actual cost data exist for recurring actions in a remedial operations or LTM phase, this data must be used to generate the estimate. Historical costs must be adjusted to current year dollars using escalation factors provided on AERO. Out year costs must be reported in current year dollars and must NOT be escalated.

Documentation to support recurring actions may be invoices, purchase orders, existing contracts, vouchers, etc. The supporting documents must be uploaded to the database of record and also be maintained in the CTC estimate file. Complete site documents must be available in the event of an audit.

Example 3a—Estimates Developed for Ongoing/Recurring Actions (Historical/Actual Costs)

CC003A Groundwater Monitoring. The estimator used historical costs to prepare the estimate. The former fuel station was used from 1941 until 1980. Underground storage tanks (USTs) were removed throughout the years from 1955 until 1999. This cleanup is for contamination caused by tanks removed prior to 1980. The state regulatory agency requires water sampling and analysis from 16 monitoring wells annually for two years for LTM.

Discussion

All investigation has been completed and the remedy has been operating for more than 2 years. Cleanup goals have been achieved. Current contract costs for 3 years of monitoring were used to calculate the estimate. The estimator used historical costs from a previous 2-year contract to prepare the estimate for Site CC003A. Historical data for recurring costs at sites in the LTM phase for more than 2 years must be used to develop site-level CTC estimates if available. The contract is used to document the actions, quantities, and the methodology for the cost.

The required documentation is:

1. MFR (see attached).
2. Supporting documentation (see attached),
   Signed Blanket Purchase Agreement (DD Form 1155) with the amount,
   Scope of Work,
   Cost $127,644 for 3 years plus USACE oversight fee of $11,488 = $139,132, and
   Duration 3 years/2 years x $139,132 = $208,698.

Example 3a—Estimates Developed for Ongoing/Recurring Actions
(**Contract for historical/actual costs**)

DEPARTMENT OF THE ARMY
Camp Cleanup
12345 ARMY HIGHWAY 27
Camp Cleanup, Germany 12345-6789

30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Site CC003A

1. Background information and strategy. This memorandum serves as formal documentation of the information used to develop the CTC estimate for CC003A. All investigation has been completed and the remedy operated for more than 2 years. Cleanup goals have been achieved. Current contract costs for 3 years of monitoring were used to calculate the estimate. As the contract was awarded in 2004, cost escalation factors were used to bring the cost to current year dollars.
   Note: Show calculations to bring contract costs to current year dollars.

2. Parameters: Contract in the amount of 108,000 Euros was executed in September 2004 to continue operations at site CC003A for CY05 and CY06. Operations will continue for an additional 3 years beyond CY06 at this site. The future work will be contracted and executed by the U.S. Army Corps of Engineers beginning in FY07. The unit cost and cost elements are included in the contract. There are no project changes or cost adjustments for scope. The costs need to be escalated from 2004 to 2006 euros and converted to dollars. The amount needs to be adjusted to include the Life Cycle Program Management (LCPM). The LCPM is 0.09.

3. Cost Estimate Calculation Summary
   Note: Use inflation factor for the country in which the site is located and list the source. For overseas, two inflation factors are used.

   FY04 to FY06 inflation: €108,205 (1.017 and 1.019 Estimated FY04 and FY05 inflation factors for Germany): (108,000 x 1.017)(1.019)[10]= € 112,135.
   FY06 Euro to Dollar conversion: €112,135/0.8785 euro/dollar = $ 127,644 dollars
   Management: ($ 127,644) (.09 LCPM[11] rate) = $11,488
   Total for contract amount in current dollars (2 years): ($ 127,644 + $11,488) = $139,132
   Future expected contract amount: (3years/2years) ($139,132) = $ 208,698 ($209K)
   Note: enter $209K in FY06

   Estimate prepared by: John Brown (757) 124-4567 John Brown 10/3/05
   SIGNATURE DATE

[10] Cite source for inflation factors. For CONUS, only one escalation rate would be used.
[11] LCPM is equivalent to USACE Supervision and Administration (S&A) Costs.

Estimate reviewed by: Hank Jones (757) 124-4567 Hank Jones 10/3/05
SIGNATURE DATE

Example 3a—Estimates Developed for Ongoing/Recurring Actions (Contract for historical/actual costs) (continued)

ORDER FOR SUPPLIES OR SERVICES PAGE 1 OF 10

1. CONTRACT/PURCH. ORDER/ AGREEMENT NO.	2. DELIVERY ORDER/ CALL NO.	3. DATE OF ORDER/CALL (YYYYMMMDD)	4. REQ./ PURCH. REQUEST NO.	5. PRIORITY
DACA90-02-D-0045	0025	2004 Sep 02	W9XFSE-4211-4001	

6. ISSUED BY	CODE	W913G8	7. ADMINISTERED BY (If other than 6)	CODE	8. DELIVERY FOB
CONTRACTING DIVISION US ARMY CORPS OF ENGINEERS					[X] DESTINATION [ ] OTHER (See Schedule if other)

9. CONTRACTOR	CODE		FACILITY		10. DELIVER TO FOB POINT BY (Date) (YYYYMMMDD)	11. MARK IF BUSINESS IS
NAME AND ADDRESS	WOLF BLUMENTHAL INGENIEURBUERO DEICHSLER STRASSE 26 NUERNBERG 90489				SEE SCHEDULE 12. DISCOUNT TERMS NET 30 DAYS	[ ] SMALL [ ] SMALL DISADVANTAGED [ ] WOMEN-OWNED
					13. MAIL INVOICES TO THE ADDRESS IN BLOCK See Item 15	

14. SHIP TO	CODE	15. PAYMENT WILL BE MADE BY	CODE	
SEE SCHEDULE		DFAS-EU/FVRC/EK UNIT 23122 APO AE 09227		MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.

16. TYPE OF ORDER			
	DELIVERY/ CALL	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
	PURCHASE		Reference your quote dated Furnish the following on terms specified herein. REF:

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR	SIGNATURE	TYPED NAME AND TITLE	DATE SIGNED (YYYYMMMDD)

[ ] If this box is marked, supplier must sign Acceptance and return the following number of copies:

17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE
See Schedule

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/ SERVICES	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	SEE SCHEDULE				

* If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.

24. TEL: [illegible] EMAIL: heike.stadtfeld@usace.army.mil BY: HEIKE STADTFELD GM

K. Stadtfeld — CONTRACTING / ORDERING OFFICER

25. TOTAL $[illegible]
26. DIFFERENCES

27a. QUANTITY IN COLUMN 20 HAS BEEN
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE	c. DATE (YYYYMMMDD)	d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE	28. SHIP NO.	29. DO VOUCHER NO.	30. INITIALS
	[ ] PARTIAL [ ] FINAL	32. PAID BY	33. AMOUNT VERIFIED CORRECT FOR
f. TELEPHONE NUMBER / g. E-MAIL ADDRESS	31. PAYMENT		34. CHECK NUMBER
36. I certify this account is correct and proper for payment. a. DATE (YYYYMMMDD) / b. SIGNATURE AND TITLE OF CERTIFYING OFFICER	[ ] COMPLETE [ ] PARTIAL [ ] FINAL		35. BILL OF LADING NO.

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED (YYYYMMMDD)	40. TOTAL CONTAINERS	41. S/R ACCOUNT NO.	42. S/R VOUCHER NO.

DD Form 1155, DEC 2001 PREVIOUS EDITION IS OBSOLETE.

Example 3a—Estimates Developed for Ongoing/Recurring Actions (Contract for historical/actual costs) (continued) (include Scope of Work or equivalent)

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		108,204.60	Lump Sum	EU1.00	EU108,204.60

Environmental Sampling at Various Locations, (

This task order is entered pursuant to Contrac nd constitutes NOTICE TO PROCEED for the following project. The Contractor shall provide all resources necessary to perform the work in accordance with the attached Schedule of Title I Services dated 12 July 2004, 8 pages, titled, "Phase III Environmental Sampling at Various Location . All work shall be accomplished in accordance with the timelines specified in the attached Schedule of Services. Reference is made to the price negotiation memorandum dated 23 July 2004 which states a revised contract price proposal of EU 108,204.60 / $ 104,910.41 and is hereby incorporated and accepted by both parties. In consideration for performance of this task order, the Contractor shall be paid the amount of EU 108,204.60, which shall constitute complete payment for all service required and performed under this task order.

Value Added Tax (VAT) is excluded.

Contracting POC: M

Exchange rate used for this action: $1.00 = EU 1.0314

PURCHASE REQUEST NUMBER: W

NET AMT	EU108,204.60
ACRN AA Funded Amount	$104,910.41

Section G - Contract Administration Data

ACCOUNTING AND APPROPRIATION DATA

AA:
AMOUNT: $104,910.41

Example 3b—Estimates Developed for Ongoing/Recurring Actions

(Historical/Actual Costs)

Site CC003B Continued Operation of SVE system. A RI conducted in October 2003 found elevated concentrations of chlorinated hydrocarbons (CHC) (mainly Trichloroethylene) in the area of the former cleaning and preservation area inside Bldg. 2371. The detected concentrations exceeded the state action levels requiring remedial actions. The CHC impact was limited to this area. Based on the results of the soil vapor investigation and test, a contract was awarded for a SVE system that was installed in FY04. The SVE system has operated for 2 years, and an additional 6 months of operation is required.

Discussion

The estimator used historical costs from a previous 2 year contract to prepare the estimate for Site CC003B. Historical data for recurring costs at sites in the RA(O) phase for more than 2 years are be used to develop site-level CTC estimates. Attached contract for €148,158 covers projects at two different sites. Of this amount, €56,056 is for 1 year of SVE at the subject site. The continuation of the RA(O) into FY06 constitutes an additional 6 months of operation.

The required documentation is:

1. MFR (see attached)
2. Supporting Documentation (see attached),
   Signed Blanket Purchase Agreement (DD Form 1155) with the amount. (€148,158),
   Scope of Work,
   Cost $66,126 for 2 years plus USACE oversight Fee of $5,951 = $72,078, and
   Duration 0.5 years x $= $36,039.

Example 3b—Estimates Developed for Ongoing/Recurring Actions

DEPARTMENT OF THE ARMY
Camp Cleanup
12345 ARMY HIGHWAY 27
Camp Cleanup, Germany 12345-6789

30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Sites CC003B

1. Background information and strategy. This memorandum serves as formal documentation of the information used to develop the CTC estimate for CC003B. All investigation has been completed at site CC003B and the remedy (SVE) has been operating for more than 2 years. Site CC003C is still under investigation and an interim remedial action is operating. Current contract costs were used to calculate the estimate. As the contract was awarded in 2005, cost escalation factors were used to bring the cost to current year dollars. Only CC003B is included in this memorandum.

2. Assumptions. A contract in the amount of 148,158 Euros was executed in January 2005 to continue operations at site CC003B and site CC003C. The portion of the cost for site CC003B for CY05 is 56,056 Euros. The SVE remedy is expected to operate for an additional 6 months of CY06. The remedy will be completed at the end of the additional 6 months of CY06 with no further action anticipated. Unit costs and cost elements are in the attached schedule of services. There are no project changes or cost adjustments. The costs need to be escalated from FY04 to FY06 Euros before converting to dollars.

3. Cost Estimate Calculation Summary

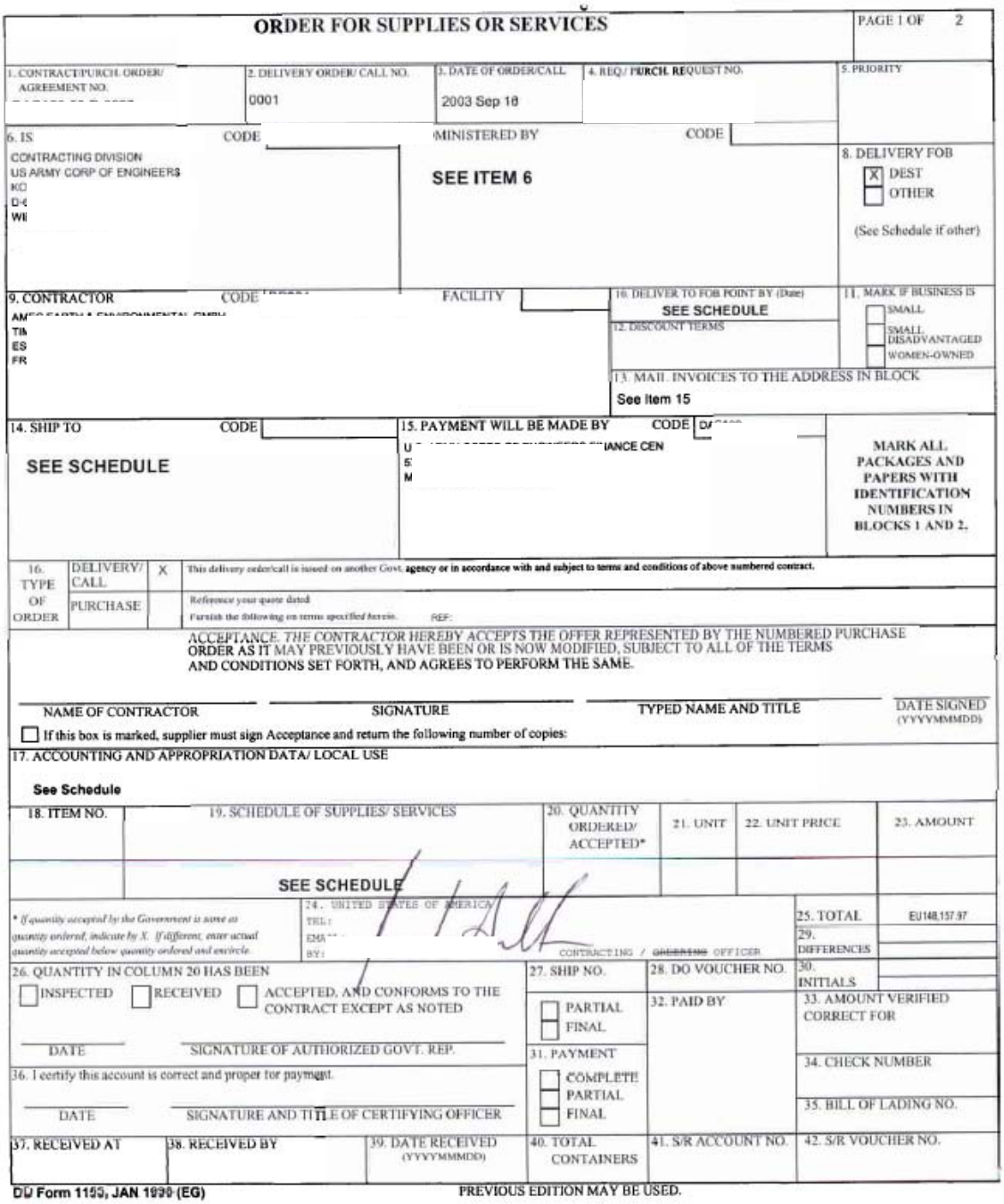
   Note: for overseas, two inflation factors are used. FY04 to FY06 inflation: €56,056 (1.017 and 1.019 Estimated FY04 and FY05 inflation factors for Germany) = € 58,092.
   FY06 Euro to Dollar conversion: €58092/0.8785 euro/dollar = $ 66,126 dollars
   Management: ($ 66,126) (.09 Life Cycle Program Management (LCPM[12] rate) = $5,951
   Total for 1 year contract: ($66,126 + $5,951) = $72,078
   Future expected contract amount: (1/2) ($70,078) = $ 36,039 ($36K)
   Note: enter $36K as the CTC

Estimate prepared by: John Brown (757) 124-4567 John Brown 10/3/05
SIGNATURE DATE

Estimate reviewed by: Hank Jones (757) 124-4567 Hank Jones 10/3/05
SIGNATURE DATE

[12] LCPM is equivalent to USACE S&A Costs.

Example 3b—Estimates Developed for Ongoing/Recurring Actions (continued)



ORDER FOR SUPPLIES OR SERVICES — PAGE 1 OF 2

1. CONTRACT/PURCH. ORDER/ AGREEMENT NO.	2. DELIVERY ORDER/ CALL NO.	3. DATE OF ORDER/CALL	4. REQ./ PURCH. REQUEST NO.	5. PRIORITY
	0001	2003 Sep 18		

6. IS ADMINISTERED BY — CODE
CONTRACTING DIVISION
US ARMY CORP OF ENGINEERS
KC
D-
WI
SEE ITEM 6

8. DELIVERY FOB
[X] DEST
[ ] OTHER
(See Schedule if other)

9. CONTRACTOR — CODE — FACILITY
AM
TI
ES
FR

10. DELIVER TO FOB POINT BY (Date)
SEE SCHEDULE

11. MARK IF BUSINESS IS
[ ] SMALL
[ ] SMALL DISADVANTAGED
[ ] WOMEN-OWNED

12. DISCOUNT TERMS

13. MAIL INVOICES TO THE ADDRESS IN BLOCK
See Item 15

14. SHIP TO — CODE
SEE SCHEDULE

15. PAYMENT WILL BE MADE BY — CODE
U
S
M
IANCE CEN

MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.

16. TYPE OF ORDER
[X] DELIVERY/ CALL — This delivery order/call is issued on another Govt. agency or in accordance with and subject to terms and conditions of above numbered contract.
[ ] PURCHASE — Reference your quote dated. Furnish the following on terms specified herein. REF:

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR | SIGNATURE | TYPED NAME AND TITLE | DATE SIGNED (YYYYMMMDD)

[ ] If this box is marked, supplier must sign Acceptance and return the following number of copies:

17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE
See Schedule

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/ SERVICES	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	SEE SCHEDULE				

* If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.

24. UNITED STATES OF AMERICA
TEL:
EMA
BY: CONTRACTING / ~~ORDERING~~ OFFICER

25. TOTAL EU148,157.97
29. DIFFERENCES
30. INITIALS

26. QUANTITY IN COLUMN 20 HAS BEEN
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED
DATE | SIGNATURE OF AUTHORIZED GOVT. REP.

27. SHIP NO.
[ ] PARTIAL
[ ] FINAL

28. DO VOUCHER NO.

32. PAID BY

33. AMOUNT VERIFIED CORRECT FOR

31. PAYMENT
[ ] COMPLETE
[ ] PARTIAL
[ ] FINAL

34. CHECK NUMBER

35. BILL OF LADING NO.

36. I certify this account is correct and proper for payment.
DATE | SIGNATURE AND TITLE OF CERTIFYING OFFICER

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED (YYYYMMMDD)	40. TOTAL CONTAINERS	41. S/R ACCOUNT NO.	42. S/R VOUCHER NO.

DD Form 1155, JAN 1990 (EG) PREVIOUS EDITION MAY BE USED.

Example 3b—Estimates Developed for Ongoing/Recurring Actions (continued)

DACA90-03-D-0027
0001
Page 2 of 2

Section B - Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		1	Lump Sum	EU148,157.97	EU148,157.97

Base Year
FFP
This task order is entered pursuant to Contract DA [redacted] constitutes NOTICE TO PROCEED for the following project. The Contractor shall provide all resources necessary to perform the work in accordance with the attached Scope of Work dated 19 August 2003 and titled, "Groundwater Monitoring at the Abandoned Landfill B
Soil Vapor Extraction Pilot Tests at Buil
DUCS Numbers WPKL132 (12135) and WPKL002 (2371). In consideration for performance of this task order, the Contractor shall be paid the amount of EU 148,157.97, which shall constitute complete payment for all service required and performed under this task order.

Value Added Tax (VAT) is excluded.

All work to be accomplished in accordance with the timelines specified in the Scope of Work.

Contracting POC

Exchange rate used for this action: $1.00 = EU 1.2403.
PURCHASE REQUEST NUMBER: [redacted]

FOB: Destination

Section G - Contract Administration Data

ACCOUNTING AND APPROPRIATION DATA

AA: 21320200000 088171 3230C7B3DK43885682000 E314 91532
COST CODE: 000000000000
AMOUNT: $119,453.33

Example 3b—Estimates Developed for Ongoing/Recurring Actions (continued)

Department of the Army
U.S. Army Corps of Engineers, Europe District
Konrad-Adenauer Ring 39
65187 Wiesbaden

CENAU-PP-EW **19 August 2003**

SCHEDULE OF SERVICES

PROJECTS: Groundwater Monitoring at the Abandoned Landfill Building 12135, [illegible] and Soil Vapor Extraction Pilot Tests at Building 2371,

I. INTRODUCTION:

Project Description:

Building 12135 Landfill: Based on results of previous investigations at the site, it was recommended to perform bi-annual groundwater monitoring over a two-year period at all existing wells at the site, to confirm that no contaminants leach out of the landfill. For this effort, eight existing monitoring wells shall be sampled on a bi-annual basis over a period of two years. The groundwater samples will be analyzed for POL, BTEX, PAH, CHC and heavy metals. The contractor shall submit letter reports after each sampling round summarizing the analytical results. A formal report shall be submitted at the end of the two-year period based on the results of the field activities, sampling and analysis.

Building 2371 Site: Based on results of previous investigations at the site, it was recommended to perform six one-week soil vapor extraction (SVE) tests over the period of one year (one test every two months) to assess the efficiency of pulse-vent SVE at the site. In order to accomplish this, 5 soil borings will be drilled to install SVE monitoring wells within the boreholes. Soil gas samples will be collected and analyzed for CHC, and six five-day SVE pilot tests will be performed over the period of one year. During the SVE tests, air flow rates, radius of influence and vapor contaminant concentrations will be determined. The contractor will submit a letter report upon completion of each five-day SVE pilot test as well as a formal report upon completion of the one-year test period based on the results of field activities, sampling and analysis.

FY 03 work at 12135 and 2371
Page 1 of 14

Example 3b—Estimates Developed for Ongoing/Recurring Actions (continued)

Building 2371 Site: During previous soil gas studies, a CHC contamination was established and fully delineated in soil vapor beneath the degreasing/preservation facility within Bldg. 2371. The results of a one-week soil vapor extraction (SVE) test indicated that SVE is applicable for mitigating the previously detected contamination.

Therefore, during this SVE Pilot Test Study, the contractor shall perform 6 one-week SVE tests over the period of one year (one test every two months) to assess the efficacy of pulse-vent SVE. During each SVE test, the contractor shall collect 9 soil vapor samples (3 during the first day of SVE; after that 1 per day) to monitor the development of contaminant concentrations. In addition, the contractor shall collect 2 samples per SVE test from the exhaust of the activated carbon filter.

Table 1 – Sampling and Analysis

Area	No. of Soil Borings	No. of Samples	Analytical Parameters
Inside Bldg. 2371	5 borings, 2 m deep, install SVE monitoring wells within boreholes	54 soil gas (+ 1 QA/QC)	**6 one-week SVE tests** 54 x soil gas for CHC

For this study, a total of five (5) soil borings with internal diameters of 50 mm shall be advanced to a depth of 2 m bgs using an electric jackhammer around the existing soil vapor extraction well. Prior to drilling, each boring location shall be surveyed for electric supply lines, telecommunication lines, and unexploded ordnance. The drill cores shall be field-screened for organic volatile vapors using a photo-ionization detector (PID) or an organic vapor analyzer (OVA) to help determine the best sampling locations and depths.

For this study, six (6) 5-day soil vapor extraction pilot tests shall be performed over the period of one year. The soil vapor equipment shall comprise of an air blower, a sampling port, an activated carbon drum, and an air/water separator. During the soil vapor extraction tests, air flow rates, radius of influence, and vapor contaminant concentrations shall be determined.

Scenario 4: Estimates Developed with Other Estimate Sources

Some cost estimates cannot be developed using a computer model and must, by necessity, be developed based on engineering studies. These estimates must be supported by contracts, invoices, or actual costs on similar completed sites. The estimator must be able to show an audit trail from the supporting documents to the estimate in the MFR.

Historical costs from similar sites must be adjusted to current year dollars using escalation factors provided on AERO for CONUS and from Resource Management (RM) for Overseas. Out year costs must be reported in current year dollars and must NOT be escalated.

The supporting documents must be uploaded to the database of record and must be maintained in the CTC estimate file. Complete site documents must be available in the event of an audit.

Example 4—Estimates Developed With Costs From Similar Sites

CCKL100 Remedial Investigation. Site CCKL100 is an industrial area including material in maintenance and storage buildings and extended open storage areas (partly paved ground) that have been filled and graded over the past 50 years. Approximately 10 separate CHC source areas have been identified with concentrations in groundwater exceeding state action levels. CHCs have also been detected in downgradient drinking water wells with contaminant concentrations that also exceed the state action levels for groundwater. A groundwater treatment system was installed at a similar nearby site CCK007 and is used as the basis for this estimate.

Discussion

The cost estimate is based on an FY05 contract for a **similar** site, CCK007. A RI/FS was completed and a groundwater treatment system was installed [RA(C)] and operated [RA(O)] for 180 days.

For this site, no feasibility study was conducted (assuming the same determination from the pilot study). The remedial design (RD) of 10% is used from RACER for projects less than $1 M. The cost for installing the groundwater treatment system is based on the RA(C) from site CCK007. The cost for estimating the system operation is based on the 180 day RA(O) from site CCK007. The system for this site is expected to operate for 5 years.

The required documentation is:

1 MFR (see attached).
2 Supporting documentation (see attached),
Signed Blanket Purchase Agreement (DD Form 1155) with the amount,
Scope of Work,
Cost Total: RA(C) ($183,413 + $16,507) = $199,920,
RD = $18,341,
RA(O) = ($72,496 + $6,524) (5 years)= $395,100, and
Total for Site: $613,361.

Example 4a—Estimates Developed With Costs From Similar Sites

DEPARTMENT OF THE ARMY
Camp Cleanup
12345 ARMY HIGHWAY 27
Camp Cleanup, Germany 12345-6789

30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Site CCKL100

1. This memorandum serves as formal documentation of the information used to develop the CTC estimate for CCKL100.

2 Background information, strategy, and assumptions. A contract in the amount of € 158, 124 was executed in April 2005 for site CCK007. A RI/FS was completed and a groundwater treatment system was installed (RA(C)) and operated (RA(O)) for 180 days. For this site, CCKL100 no feasibility study was conducted (assuming the same determination from the pilot study). It is assumed the cleanup decision will be the same as site CCK007. The RD of 10% is the industry standard for projects less than $1 M. The cost for installing the groundwater treatment system is based on the RA(C) from site CCK007. The cost for estimating the system operation is based on the 180 day RA(O) from site CCK007. The system for this site is expected to operate for 5 years. There are no project changes or cost adjustments.

3 Cost Estimate Calculation Summary

RA(C) FY05 to FY06 inflation factor: € 158,124 (1.019 estimated FY05 inflation factor for Germany) = €161,128
FY06 Euro to Dollar conversion: € 161,128/0.8785 euro/dollar = $ 183,413 dollars
Management: ($ 184,413)(.09 Life Cycle Program Management (LCPM)[13] rate) = $16,507
RD 10% ($183,413)(.10)= $18,341
RA(O) (€15,625)(4 quarters per year) = €62,500

FY05 to FY06 inflation factor: €62,500 (1.019 estimated FY05 inflation factor for Germany) = €63,688
FY06 Euro to Dollar conversion: € 63,688/0.8785 euro/dollar = $72,496 dollars
Management: ($ 72,496) (.09 LCPM rate) = $6,524

Total: RA(C) ($183,413 + $16,507) = $199,920
RD = $18,341
RA(O) = ($72,496 + $6,542) (5 years)= $395,100
Total for Site: $613,316

[13] LCPM is equivalent to USACE S&A Costs.

Note: enter $200K in FY06

Estimate prepared by: John Brown (757) 123-4567 
SIGNATURE DATE

Estimate reviewed by: Hank Jones (757) 123-4567 
SIGNATURE DATE

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

ORDER FOR SUPPLIES OR SERVICES — PAGE 1 OF 9

1. CONTRACT/PURCH. ORDER/ AGREEMENT NO.	2. DELIVERY ORDER/ CALL NO.	3. DATE OF ORDER/CALL (YYYYMMMDD)	4. REQ./ PURCH. REQUEST NO.	5. PRIORITY
	0006	2005 Apr 19		

6. ISSUED BY	CODE	7. ADMINISTERED BY (if other than 6)	CODE	8. DELIVERY FOB
CONTRACTING DIVISION U.S. ARMY CORPS OF ENGINEERS		**SEE ITEM 6**		[X] DESTINATION [ ] OTHER (See Schedule if other)

9. CONTRACTOR	CODE	FACILITY	10. DELIVER TO FOB POINT BY (Date) (YYYYMMMDD)	11. MARK IF BUSINESS IS
NAME AND ADDRESS			**SEE SCHEDULE** 12. DISCOUNT TERMS Net 30 Days	[ ] SMALL [ ] SMALL DISADVANTAGED [ ] WOMEN-OWNED
			13. MAIL INVOICES TO THE ADDRESS IN BLOCK See Item 15	

14. SHIP TO	CODE	15. PAYMENT WILL BE MADE BY	CODE	
SEE SCHEDULE		U.S. ARMY CORPS OF ENGINEERS FINANCE CEN	DACA90	**MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.**

16. TYPE OF ORDER			
	DELIVERY/ CALL	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
	PURCHASE		Reference your quote dated Furnish the following on terms specified herein. REF:

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR | SIGNATURE | TYPED NAME AND TITLE | DATE SIGNED (YYYYMMMDD)

[ ] If this box is marked, supplier must sign Acceptance and return the following number of copies:

17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE

See Schedule

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/ SERVICES	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	SEE SCHEDULE				

* If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.

24. UNITED STATES OF AMERICA
TEL: 6
EMAIL:
BY: MA
mil
CONTRACTING / ORDERING OFFICER

25. TOTAL EU158,123.82
26. DIFFERENCES

27a. QUANTITY IN COLUMN 20 HAS BEEN
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE | c. DATE (YYYYMMMDD) | d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE

f. TELEPHONE NUMBER | g. E-MAIL ADDRESS

36. I certify this account is correct and proper for payment.

a. DATE (YYYYMMMDD) | b. SIGNATURE AND TITLE OF CERTIFYING OFFICER

28. SHIP NO.	29. DO VOUCHER NO.	30. INITIALS
[ ] PARTIAL [ ] FINAL	32. PAID BY	33. AMOUNT VERIFIED CORRECT FOR
31. PAYMENT [ ] COMPLETE [ ] PARTIAL [ ] FINAL		34. CHECK NUMBER 35. BILL OF LADING NO.

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED (YYYYMMMDD)	40. TOTAL CONTAINERS	41. S/R ACCOUNT NO.	42. S/R VOUCHER NO.

DD Form 1155, DEC 2001 PREVIOUS EDITION IS OBSOLETE.

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

Section B—Supplies or Services and Prices

ITEM NO	SUPPLIES/ SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		158,123.82	Each	EU1.00	EU158,123.82
	Base Item Ground water Treatment System FFP The Contractor shall provide services in accordance with the attached Scope of Work dated 11 March 2005. This task order constitutes NOTICE TO PROCEED for this project. Period of performance shall not exceed 31 January 2007. Value Added Tax (VAT) is excluded Exchange rate used for this action is$1.00 = EU1.0314 Contracting POC: Mark Coleman telephone 767-565-1212 PURCHASE REQUEST NUMBER: WWWD06-5106-2725				
				NET AMT	EU158,123.82
	ACRN AA Funded Amount				$153,309.89
0002		15,624.87	Lump Sum	EU1.00	EU15,624.87
OPTION	Option One FFP Operation. Performance period 90 days. Work shall be conducted in accordance with the attached Statement of Work dated 11 March 2005.				
				NET AMT	EU15,624.87
	Funded Amount				$0.00

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

Section C—Descriptions and Specifications

SCOPE OF WORK

US Army Corps of Engineers

CEANU-PP-EN 11 March 2005

Project: Groundwater Contamination Pilot Test Study site

Contract: WWWD06-5102-2726

BACKGROUND:

Chlorinated hydrocarbons (CHC) have been detected in drinking water wells downgradient of the CCK007 in the past with contaminant concentrations ranging from non-detectable to 14.9 ug/L. Therefore, extensive groundwater studies have been performed at this installation since 1985. During these studies, a massive and complex CHC contamination has been detected, which is comprised of at least 8 distinct but partially overlapping contamination plumes in groundwater.

Based on all available data, a comprehensive groundwater model was performed to assess groundwater flow and contaminant transport for the whole area: During the initial modeling phase, a preliminary flow model was developed, which was refined during the second modeling phase. During the third modeling phase, contaminant transport was also modeled. As a result of these groundwater modeling efforts, 10 different remediation scenarios were developed. It was recommended that a remediation pilot test be performed in the vicinity of the source area to assess the feasibility of enhanced in-situ biodegradation for groundwater remediation by introducing molasses into the groundwater. Moreover, it was recommended that the results of this pilot test be used to assess the benefits, risks, and costs of performing enhanced in-situ biodegradation for 5 different remediation scenarios as outlined in the phase III groundwater model report.

GENERAL REQUIREMENTS:

With regard to site specific requirements the Contractor shall:

- Obtain digging permits and other site utility clearances as required by the installation to ensure that the borings and other soil probing do not encounter underground utilities or other structures.

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

- Be responsible for disposal of the soil samples and other soil excavated in the process of his boring operations. The Contractor shall obtain approval for the disposal site and method of disposal from the Government Contracting Officer's
- Authorized Representative (COR). The method of disposal will be determined after the laboratory analysis is completed.

WORK TO BE PERFORMED:

The objective of this project is to determine the best remediation method for the CC003A source area site. Specifically, the objective of this task order is to conduct a remediation pilot test in the vicinity of the source area to assess the feasibility of enhanced in-situ biodegradation of groundwater contamination. The results of this pilot test will be used to assess benefits, risks, and costs of performing enhanced in-situ biodegradation for 5 different remediation scenarios as outlined in the phase III groundwater model report. The study objectives will be accomplished through the performance of the tasks described below.

TASK 1—DEVELOP HEALTH AND SAFETY PLAN (HASP). The HASP which the Contractor shall develop will comply with OSHA, the Corps of Engineers Health Requirements Manual (engineer manual document number EM 385-1-1 as of 3 September 1996), Host Nation and local regulatory requirements. The HASP will address potential hazards that the investigation activities may present to the Contractor's personnel as well as to the BSB community. The plan will detail personnel training and responsibilities, project equipment, decontamination, medical surveillance, and other applicable procedures and protocols for maintaining complete project safety. Any actions required to protect the surrounding community and other third parties (e.g. visitors) will be discussed. The HASP must also be submitted in a report format to the Government Project Manager and the BSB and approved by the EUD Project Manager before intrusive field activities can commence. The HASP will be submitted electronically in English to the EUD PM and the BSB.

TASK 2—WORK PLAN, SCHEDULE and KICK OFF MEETING. The Contractor will develop a work plan and schedule for the work to be conducted at the site. The work plan and schedule will apply to all tasks to be performed as part of this project. The Work Plan and Schedule will be submitted electronically in English to the EUD PM and the BSB, and will be a topic of discussion at the kickoff meeting. Therefore, the work plan and schedule must be submitted at least five working days prior to the kickoff meeting. A revised work plan and schedule will be prepared and distributed in English electronically to the EUD PM and BSB within 5 working days after the kickoff meeting if there are any government comments.

TASK 3—ON-SITE DRILLING/TESTING AND PILOT TEST PROGRAM. The on-site drilling/testing and pilot test program will commence after the receipt of approval of the Contractor's HASP. The Contractor shall employ drilling and sampling procedures which

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

will ensure that a “short-cut” migration of contaminants into adjacent uncontaminated strata and groundwater levels will not occur. The Contractor shall be responsible for obtaining accurate locations for each monitoring well. The following sub-tasks shall be accomplished by the Contractor as part of the required fieldwork (Table 1 summarizes specific information on drilling depths and required sampling and analysis).

During previous investigations performed since 1985, an extensive CHC contamination in groundwater was detected beneath the property. Ten different remediation scenarios have been developed during performance of a three-step groundwater model. It was recommended that a pilot test be performed to assess the feasibility of enhanced in-situ biodegradation using molasses. Moreover, it was recommended that the results of the pilot test be incorporated into the groundwater model to further assess five of ten previously developed groundwater remediation scenarios.

The intention of the pilot test is to determine the optimum mass of reagents, the radius of influence from a single injection point, and the dosing frequency necessary to maintain a reducing environment in groundwater. As the distances between the groundwater wells within the actual groundwater well network are too great, the installation of four (4) new groundwater monitoring wells is required. These wells will be drilled near well GWM 123 and GWM 124 in the fractured rock aquifer to depths of approximately thirty (30) m with pipe diameter of at least 100 to 125 mm utilizing dry and/or wet drilling in an rotary mode or by ramming (dry). One of the wells will be used for molasses injection and the other three wells will be used for the monitoring. It is assumed that one existing upgradient well may be used for background sampling.

Upon completion of the wells, a geophysical survey will be performed at all newly constructed wells. The pilot test itself will then commence with a biochemical baseline monitoring. This monitoring will be done not only in the newly drilled wells but also in surrounding monitoring wells. If multiple water-bearing fractures are identified in a single monitoring well, then more than one sample may be collected. A total of ten (10) wells will be selected for this initial sampling round. All groundwater samples will be analyzed for the parameters listed in Table 1 below.

The results of this initial sampling round will be used to design the initial injection of molasses. Injection of the molasses will likely be repeated on a biweekly basis for the first 3 months of the pilot test period of performance (POP). The required optimum injection intervals will be determined based upon the monitoring results. It is currently estimated that monthly injections will be performed during the later phases of the pilot test (estimated total injection events: fifteen (15)).

During the two initial injection events, the tracer substance Uranin will be added as a so-called conservative tracer to ensure that all effects determined in the monitoring wells downgradient of the injection wells are really attributable to the injection of the molasses.

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

The POP of the pilot test will be twelve (12) months. It is estimated that the feasibility of molasses injection for enhanced in-situ biodegradation can be fully evaluated/validated after this POP. In the case that more months would be required, a modification to the contract for additional time would be administered. For that, groundwater monitoring has

to be performed at the downgradient wells as well. It is currently estimated that after the initial sampling round and molasses injection, five (5) groundwater samples each will be collected after 2, 4, 6, 9 and 11 months of the POP. Only for the last sampling round, the same amount of wells will be sampled as during the initial sampling round.

Since the oxygen reduction regime is a crucial factor for biodegradation of CHCs, the oxygen reduction potential in groundwater at the five surrounding monitoring also has to be monitored in addition to the regular groundwater monitoring events as described above. This will be performed after each molasses injection to ensure that the injection have lead to the required redox environment.

The pilot test will be validated based on an in-depth evaluation of all data collected during the pilot test. All results and recommendations shall be presented in a report including recommendations for potential full-scale implementation (on a conceptual level).

Table 1—Sampling and Analysis

No. of Soil Borings	No. of Monitoring Wells	No. of Samples	Analytical Parameters
None	4 wells, 5," 30 meters deep	45 ground-water plus 1 QA/QC	45 x groundwater for CHC, CHC byproducts, DOC, Nitrate, Nitrite, Iron, Manganese, Sulfate, Sulfite, Chloride, Carbon Dioxide, Uranin, ORP

For this pilot test study, four (4) five-inch monitoring wells shall be installed depths of approximately 30 m bgs in the source area. All wells shall be installed in accordance with State standard procedures. Prior to drilling, each drilling location shall be surveyed for electric supply lines, telecommunication lines, and other underground lines to avoid destruction of infrastructure at the site.

Full drilling cores shall be obtained at all drilling locations. The drill cores shall be visually inspected for the presence of obvious contamination and field-screened for organic volatile vapors using a photo-ionization detector (PID) or an organic vapor analyzer (OVA). PID/OVA readings as well as visual findings shall be recorded on boring logs. Detailed logs of all piezometer cores shall be prepared according to DIN 4022 and 4023.

Upon completion of the wells, geophysical surveys (down-hole) shall be performed at all newly installed wells including salinity logs, gamma-ray logs, and flow-meter logs.

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

The total number of meters may deviate from the proposed plan as long as at least 4 wells at a maximum of 120 drilling meters are installed. If additional wells or meters should be required, a modification to the contract for additional quantities of these items would be

administered. The newly installed wells shall be surveyed to determine exact grid coordinates and elevations of the piezometers and groundwater levels.

All wells shall be developed no sooner than 48 hours and no later than 7 days after installation. Development shall proceed until a) the well water is clear to the unaided eye and b) a minimum of three times the standing volume in the well to include the saturated annulus assuming 30% annular porosity is pumped, if possible. No water shall be added during piezometer development. The development shall not use high pressure or air to evacuate water from the borehole. During development, the water shall be moved throughout the entire water column by periodically raising and lowering the pump intake.

Each of the 4 new wells shall be allowed to reach hydraulic and chemical equilibrium before groundwater is sampled and the pilot test commences, if possible. Sampling shall commence no sooner than 7 days after development. Immediately prior to groundwater sampling and starting the pilot test, the water table elevation shall be measured.

Upon completion of the pilot test, molasses as well as a tracer (uranin) shall be injected into one well. Following this initial injection event, molasses injections will be repeated on an approximately bi-weekly basis over the first 3 months of the pilot test and likely on a monthly basis over the remaining pilot test period (total of 1 year).

The efficiency of the pilot test shall be monitored during 6 groundwater sampling events, one each prior to injecting the molasses and after 2, 4, 6, 9, and 11 months, during which 5 wells each shall be sampled. In addition, 10 additional wells shall be sampled during the initial and during the very last sampling round.

Prior to collecting each groundwater sample, field measurements for temperature, pH, electric conductivity, RedOx potential, and O_2 will be performed to ensure that chemical equilibrium is reached. Sampling equipment shall be decontaminated after each sampling.

TASK 4—LABORATORY ANALYSIS. The Contractor shall analyze the samples collected as required in Table 1.

TASK 5—REPORT PREPARATION. The contractor shall submit a formal report based on the results of the field activities, sampling, and analysis.

The report shall consist of a table of contents, executive summary, introduction, field program, discussion of results, conclusions, and recommendations.

The results of all findings of this investigation shall be summarized in the report along with condensed presentations (e.g. graphs, tables, or charts) of the test data and a detailed

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

plan drawing of the sampling locations. Specific sampling and analytical procedures used, and detection limits for all testing methods will be presented in the report. Potential contamination problems included in the report should be stated clearly and highlighted. Significant findings of an unusual or unexpected nature are to be discussed. Subsurface

materials shall be described and hydrogeologic conditions and processes influencing the migration of contaminants shall be characterized.

The discussion of results shall include but is not limited to the following:

- The sampling and analysis program should reveal the following environmental information: Determine the absence or presence of contamination beneath the surface; define the type and source of individual contaminants; and discuss the spatial (i.e. vertical and horizontal) distribution of any contaminants discovered. Compare the results of the previous study to new findings. Indicate contaminated areas and then delineate by isoconcentration contour maps for each compound wherever practical.

- Based on the results of the field investigation and laboratory analysis, the Contractor will present an in-depth evaluation of the pilot test results at the site and assess contaminants according to federal and applicable state regulations. Other contamination findings as analyzed are also to be presented in an overall framework. The efficiency of enhanced in-situ biodegradation will be evaluated and the efficiency will be assessed and the potential applicability to the whole contamination plume(s) will be discussed. Graphic illustrations will be included in the report to clarify or highlight particular aspects of any potential contamination problems. Contamination distribution maps shall present a compilation of all test data obtained during this study. All data presented shall be in accordance with the IMA-E geospatial data standards and existing GIS systems at the BSB.

- Based on the results of the pilot test, the contractor shall assess the benefits, risks, and costs for five different remediation scenarios. These scenarios include implementing enhanced biodegradation for source zone mass reduction.

- Conclusions shall be stated regarding the completeness and degree of confidence in the research and field investigation performed to date. If any requirements for further field and laboratory investigation are required, they shall be presented along with well supported justifications for that work.

- The Contractor shall present cost-effective and sound engineering solutions including cost estimates to correct potential environmental problems at the site, if necessary.

- The contractor shall prepare a decision document and provide it separately from the site report, in accordance with IMA-E guidance for preparation of decision

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

documents. The DD will be provided in English only, via email to the IMA-E POC, the BSB POC and the EUD PM for review and acceptance. The BSB will coordinate the DD for signature and proper approvals. The Decision Document shall be applicable to the site as well as other sites within the groundwater model report for which molasses method remediation could be implemented.

A draft report shall be submitted on CD-ROM in English and distributed to the EUD PM (1 CD), IMA-E (1 CD) and the BSB (2 CDs). After the draft is reviewed by the Government, the Contractor shall translate the report into German and deliver printed copies of the English and German final as follows: EUD PM—1 final CD with both language versions, 1 final English printed copy and 1 final German printed copy; BSB—1 final CD (both languages), 1 CD German copy only (for HN) 1 final English printed copy and 3 final German printed copies; IMA-E—1 final CD (both languages). The BSB will make distribution to the host nation.

It is anticipated that an internal Army review meeting will be held as well as a presentation meeting with the host nation.

SCHEDULE: (in days after NTP)

Deliverable	Due Date
Submit HASP, WP and Schedule	45 days after NTP
Kickoff meeting	Within 5 days of submittal of WP and Schedule
Final WP and Schedule, if required	Within 5 days of kick off meeting
Begin Pilot Test	Within 14 days of EUD PM notification to begin
Complete Pilot Test	370 days after start
Draft English Site Report	Within 30 days of completion of pilot test
Army Review Meeting	Within 14 days after receipt of government comments
Final Report and CDs	Within 30 days of review meeting
Presentation Meeting with HN	Ideally within 30 days of submittal of final report; will depend on availability of HN officials for scheduling

Example 4a—Estimates Developed With Costs From Similar Sites (Continued)

Invoices: The Contractor shall submit invoices to the EUD PM for payment, using the ENG93 format. The Contractor can submit up to 12 invoices throughout the performance period of the task order. The period of performance will not exceed 31 January 2007 (630 days performance period). If option one is awarded, the period of performance shall be extended to 31 May 2007 (120 days additional), and if option two is awarded, the period of performance shall again be extended to 28 September 2007 (120 days additional).

OPTION 1: The Contractor shall perform the pilot test for an additional 90 days as per task 3 above, with monitoring/sampling occurring every 45 days (twice during the performance period of the option).

OPTION 2: The Contractor shall perform the pilot test for an additional 90 days as per task 3 above, with monitoring/sampling occurring every 45 days (twice during the performance period of the option).

END OF REQUIREMENTS

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR

(RACER and historical costs)

Site CCSS109 Former Maintenance Shop. From 1976, the area was used as a maintenance shop. It is suspected that the area was used as a dump area from 1945 to 1976 and domestic waste (tin cans, glass, paper, ash, etc.) These wastes may partly contain components of oil and/or petrol. The adjacent eastern area was used as a landfill, which was closed a few years ago (this area was not part of this investigation). The surface of the shop parking lot is unsealed and partially covered with gravel.

A RI was completed in 2003 and showed concentrations in groundwater exceeding state action levels. The surface area of the former maintenance shop parking lot was approximately 200 by 300 m (60,000 m^2). The dump contained material consisting of domestic wastes, industrial wastes, soil, and rubble. Phase II of the RI needs to be completed to further delineate the contamination. Natural attenuation is the proposed remedial action at this site.

Discussion

The estimate is based on a RACER estimate for the landfill cap and historical costs (i.e., contract) from operation monitoring will be used for MNA estimates under RA(O).

The required documentation for upload to the database of record for the CTC estimate is:

1. MFR (see attached).
2. Supporting Documentation (see attached),
   Cover page—RI Report,
   RA(C)—Quantity 60,000 m^2 surface area to be capped with Standard Cap, and
   RA(O)—contract pages for monitoring costs.
3. RACER Database .mdb file.

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR (Continued)

DEPARTMENT OF THE ARMY
Camp Cleanup
12345 ARMY HIGHWAY 27
Camp Cleanup, Germany 12345-6789

30 September 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Sites CCSS109

1. This memorandum serves as formal documentation of the information used to develop the CTC estimate for CCSS109.

2. Background Information, strategy, and assumptions. A RI was completed in 2003 and showed concentrations in groundwater exceeding state action levels. The surface area of the former maintenance shop was approximately 200 by 300 m (60,000 m^2) material consisting of domestic wastes, industrial wastes, soil and rubble were disposed. Phase II of the RI needs to be completed to further delineate the contamination. Natural attenuation is the proposed remedial action at this site. The estimate is based on a RACER estimate for the landfill cap and historical costs (i.e., contract) from operation monitoring will be used for MNA estimates under RA(O). A contract in the amount of 121,552 Euros was executed in April 2005 for the monitoring activities at 3 landfills. Estimate 10 years of MNA are required for closure. There are no project changes or cost adjustments. The costs need to be escalated from FY04 to FY06 Euros before converting to dollars.

3. Cost Estimate Calculation Summary
   FY04 to FY06 inflation: €73,685 (1.017 and 1.019 Estimated FY04 and FY05 inflation factors for Germany) = €76,631 for 5 years.
   FY06 Euro to Dollar conversion: €76,631/0.8785 euro/dollar = $ 86,923 dollars
   Management: ($ 86,923) (.09 Life Cycle Program Management (LCPM) rate) = $7,823
   Total for 5 years: ($86,923 + $7,823) = $94,746/5
   Note: enter $19K per year for 10 years for MNA.

   Total from RACER estimate for landfill cap RA(C): $5,245,788
   Future expected contract amount: $5,245,788 + $93,162 = $ 5,338,950
   Note: enter $5,246 K in FY06 and $19K each year FY07 through FY16

Estimate prepared by: John Brown (757) 123-4567 John Brown 10/3/05
SIGNATURE DATE

Estimate reviewed by: Hank Jones (757) 123-4567 Hank Jones 10/3/05
SIGNATURE DATE

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR (Continued)

Interim Field Report

REMEDIAL INVESTIGATION

FORMER MAINTENANCE SHOP

BUMGARTEN, GERMANY

Prepared for

Prepared by:

HYDROGEO Consulting

Camp Cleanup, Germany

February 2003

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR (Continued)

Interim Field Report (continued)

Assumptions

From this investigation, the following volume assumptions can be made:

- The dump area is approximately 60,000 square meters.
- The volume of waste material is approximately 60,000 square meters by and average of 2.5 meters depth totaling approximately 150,000 cubic meters.
- The volume of the overburden, including the berms of the maintenance shop parking lot, assumed clean, is approximately 60,000 square meters by an average of 5 meters depth totaling approximately 300,000 cubic meters.
- The volume of the perched water within the waste is approximately 100,000 cubic meters—the mobility of the perched water is unknown.
- The waste is a source of methane in the soil; methane comprises up to 80% by volume of the soil-gas, or an average up to 50% by volume across the area of concern.
- TPH was detected in the waste material up to 1,700 ppm with a total mass of approximately 300 tons.

Data Gaps

Based on the first phase of the remedial investigation, the following areas of uncertainty remain:

- The connection of the perched water between the maintenance shop landfill and the adjacent landfill is not known.
- The communication between the perched water encountered at approximately 5 meters and the regional groundwater at 10 to 12 meters has not been determined.
- The mobility of the perched water, and therefore the potential fate and transport of the contaminants, is not known.

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR (Continued)

04/055

ORDER FOR SUPPLY AND SERVICES Page 1 of 1

1. Contract Purch Order/Agreement No	2. Delivery Order No	3. Date of Order	4. Requisition Purch Request No	5. Priority
A90-02-D-0045	0026		4, 21 Jul 04	

6. Issued by: CODE DE
US Army Corps of Engineer, Europe Distric
CMR 410, BOX 7,
g 329
EP-AE
9114

6. Delivery FOB: ☒ DESTINATION ☐ OTHER (See schedule if other)

7. CONTRACTOR: CODE FACILITY CODE
25

10. DELIVER TO FOB POINT BY (Date): See SOS
11. MARK IF BUSINESSES: ☒ SMALL ☐ SMALL DISADVANTAGED ☐ WOMEN-OWNED
12. DISCOUNT TERMS: NET
13. MAIL INVOICES TO: See Block 7

14. SHIP TO: CODE
See Schedule of Services

15. PAYMENT WILL BE MADE BY: CODE
Defense Fin & Acct Service, Europe
/FVRC/EK

MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER

16. TYPE OF ORDER: DELIVERY — This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
PURCHASE — Reference your ____ furnish the following on terms specified herein.
ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER PRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME

W81 — NAME OF CONTRACTOR — ☐ If this box is marked, supplier must sign acceptance and return the following number of copies
SIGNATURE — HOGER TYPED NAME AND TITLE — 27 July 2004 DATE SIGNED

17. ACCOUNTING AND APPROPRIATION DAT LOCAL USE AJK12M 091089 € 121.551,63 $ 117,851.11 ($ 1.0314)

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/SERVICE	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	This task order is entered into pursuant to IDT Contract for Architect/Engineer Title 0-02-D-0045, 26 April 2002 and constitutes NOTICE TO PROCEED.				
	a. The Architect/Engineer shall perform Title I Services in accordance with Schedule of Title I Services, 04 May 04, 7 pages, o. 7T-6137-03, Monitor Re-Capped Landfills, Phase III, Hohenfels, copy attached hereto and made a part hereof.				
	b. In consideration of the performance of the Services outlined above, the Architect/Engineer shall be paid the amount of 121.551,63 which shall constitute complete payment for all services required and performed under this task order.				
	c. VALUE ADDED TAX is excluded from the task order price.				

* If Quantity accepted by the Government is same as quantity ordered, indicate by x if different, enter actual quantity accepted below quantity ordered and encircle

24. UNITED STATES OF AMERICA — BY CONTRACTING/ORDERING OFFICER

25. TOTAL € 121.551,63
26. DIFFERENCES

26 QUANTITY IN COLUMN 20 HAS BEEN ☐ INSPECTED ☐ RECEIVED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED
DATE — SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

27 SHIP NO — ☐ PARTIAL ☐ FINAL
28 DO VOUCHER NO
30 INITIALS
31 PAYMENT ☐ COMPLETE ☐ PARTIAL ☐ FINAL
32 PAID BY
33 AMOUNT VERIFIED CORRECT FOR
34 CHECK NUMBER
35 BILL OF LADING NO

35 I certify this account is correct and proper for payment
DATE — SIGNATURE AND TITLE OF CERTIFYING OFFICER

37 RECEIVED AT | 38 RECEIVED BY | 39 DATE RECEIVED | 40 TOTAL CONTAINERS | 41 S/R ACCOUNT NUMBER | 42 S/R VOUCHER NO

DD Form 1155, Sep 89 — Previous editions are obsolete
445/248

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR (Continued)

Section B—Supplies or Services and Prices

ITEM NO	SUPPLIES/ SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		158,123.82	Each	EU1.00	EU73,685

Base Item Monitor Capped Landfill

FFP

The Contractor shall provide services in accordance with the attached Scope of Work dated 11 March 2005. This task order constitutes NOTICE TO PROCEED for this project. Period of performance shall not exceed 31 January 2007.

Value Added Tax (VAT) is excluded

Exchange rate used for this action is$1.00 = EU1.0314

Contracting POC: Mark Coleman Telephone 767-565-1812
PURCHASE REQUEST NUMBER: WWWD06-5122-2526

NET AMT EU73,685

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR (Continued)

AETT-SG-PW-EP
Architect / Engineer Section

7T-6137-03 PHASE III

7. **Monitoring of the Landfill Gas Composition**
The composition of the landfill gas shall be tested by sampling and analysing of landfill gas one time a year. The sampling and analysing shall be done by a firm which has the approval according BImSchG.

Following parameters shall be tested within the main collector line:
gas volume stream (Nm^3)
methane
carbondioxide
nitrogene
oxygene
total chloride
total fluoride
total sulphur
benzol
venylchlorid

The results shall be documented within a report.

8. **Monitoring of the Leachate Water acc. to Para II of the Operational Permit of the New Landfill**
The composition of the leachate water shall be tested by sampling and analysing out of the leachate tank
The samples shall be tested by down listed scope parameters only once a year according to the complete survey scope of parameters. The scope of testing is in accordance with the approved landfill yearbook Y2003 and the reduction of parameters and testing is approved by the letter of the WWA Regensburg (dated 29. April 2004).

Following parameters shall be tested:

Parameter	Complete Survey
Coloring	X
Turbidity	X
Odor threshold value	X
Water temperature	X
PH value	X
Electrical conductivity	X
Calcium (Ca)	X
Magnesium (Mg)	X
Sodium (Na)	X
Potasium (K)	X
Manganese (Mn)	X
Iron (Fe)	X
Ammonium (NH4)	X
Chloride (Cl^-)	X
Sulfate ($SO4^{2-}$)	X
Nitrate (NO^{3-})	X
Nitrite (NO^{2-})	X
TOC	X
PAH (16 ea key subst.)	X
POL	X

Page 3 of 7
D:\daten\Winword\Title1&Negos\T-06137-03 Monitor Landf Ph3-WBI45-26.doc

Example 4b: Estimates Developed With Mixed Estimate Sources and Non-RACER Generated MFR (Continued)

AETT-SG-PW-EP
Architect / Engineer Section

7T-6137-03 PHASE III

Lead (Pb)	X
Cadmium (Cd)	X
Chrome (Cr)	X
Nickel (Ni)	X
Copper (Cu)	X
Mercury (Hg)	X
Zinc (Zn)	X
Boron (B)	X
Additional Parameters for the Rahmenabwasserverwaltungsvorschrift	
AOX	X
Cr VI	X
As	X
Cyanide, high volantile	X
Sulfide	X
COD	X
Hexogene and other ammunition	X

9. **Input of Data into the Landfill Diary and Preparation of the Yearly Landfill Documentation (Deponiejahrbuch) until Dec 2005**
Input data into landfill diary
All the test results shall be documented into a landfill diary.
Also data from other inspections (degassing station, leachate collection tank) and the documentations of the climate data shall be taken and documented within the diary for the complete period of the monitoring.

10. **Preparation of the yearly landfill documentation for 2005**
The yearly landfill documentation shall be done for the entire year 2005 (submittal latest March 2006). In total 1 year of the supervisory actions of the landfill shall be documented.
The documentation shall be worked out according to the standards of the „Bayer. Landesamt für Umweltschutz" (LfU). The contractor shall do his interim documentation of the single test results this way that a later documentation within the yearly report can be done without any difficulties.

11. **Monitoring the Surface Water Monitoring Stations, Spring Kuehbrunnen and Soil Moisture Data Logger at Bldg # 91 until Dec 2005.**
The Contractor shall control and monitor six monitoring stations, spring Kuehbrunnen and 2 each soil moisture monitoring locations every 2 weeks. The work includes the control of function, downloading of data and data analysis and evaluation for it's reference to the landfill condition and it's impact to the surface water and ground water.

12. **Maintenance of the Surface Water and Spring Kuehbrunnen Monitoring Stations until 31 Dec 2005.**
The contractor shall do the maintenance of six surface monitoring stations and the monitoring station spring Kuehbrunnen. (2 times per year)

13. **Monitoring of Data Loggers at Ground Water Monitoring Wells until Dec 2005:**
The information being gathered by the data loggers and saved by a central data file at the monitoring wells shall be read out by the Contractor and shall be evaluated and converted in Excel data format. This work shall be done every 2 months due to limited capacity of the loggers.

Page 4 of 7
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Scenario 5: Estimates Developed With Multi-Year Fixed Price Contract

A performance-based contract was awarded to investigate, clean up, and close out sites at INSTALLATION, STATE. The contract funded the Remedial Design of a Soil Vapor Extraction/Bioventing/Air Sparging System with the initial award. Options were identified as Contract Line Item Numbers (CLINs) on the contract that may be awarded based on progress and funding. Contract modifications are used to exercise options under the contract. As the costs for the entire contract, including options, were negotiated as part of the contract award, the costs must not be escalated to current year dollars. For options that have not been activated, the costs must be entered in the database of record as required funding as listed in the contract for the year the option is scheduled to be activated.

DISCUSSION

The estimate is based on an awarded contract. The estimate is entered in the database of record only for the contract options that have not been activated. These estimates are entered in the database of record according to program-specific guidance. Once the contract options have been exercised, they must be entered in the database of record as obligated funding for the fiscal year the option was awarded.

The required documentation for upload to the database of record for the CTC estimate is

1. MFR (see attached).
2. Supporting documentation (see attached)
    a. Entire basic contract or
    b. Contract modifications w/entire basic contract.

The entire basic contract must be uploaded with each data call if the information does not carry forward from the previous data call. Contract modifications/amendments should be amended to the basic contract file and uploaded as a single file.

NOTE: Due to the length of the actual documents, the examples have been modified to reflect a representation of a multi-year fixed price contract.

Example 5: Estimates Developed With Multi-Year Fixed Price Contracts

DEPARTMENT OF THE ARMY
INSTALLATION
12345 ARMY HIGHWAY 27
ANYCITY, STATE 12345-6789

16 December 2005

MEMORANDUM FOR RECORD

SUBJECT: Cost-to-Complete Estimate (CTC) for Site FUBR001 at INSTALLATION, STATE

1. This memorandum serves as formal documentation of the information used to develop the CTC estimate for cleanup at site FUBR001 at INSTALLATION, STATE.

2. Background and Strategy. A multi-year fixed-price contract was awarded in September 2004 for cleanup of site FUBR001 for a total value of $782,000. The initial award funded CLINs 0001 and 0002 for the Remedial Design of a Soil Vapor Extraction/Bioventing/Air Sparging system at $30,000 and construction of this remedial action (RA(C)) at $302,000 for a total of $332,000 to be completed by September 20006. Contract options for CLINs 0003 for Operations (RA(O))for 3 years and Long-Term Management (LTM for 5 year) listed in the contract may be activated/exercised based on performance and availability of funds. These costs are entered into the database of record as requirements. These costs will not be escalated to current year dollars since the costs are negotiated amounts.

3. Cost Estimate Calculation Summary

Contract options that have not been activated are:

0003—RA(O)—$275,000 for FY07 through FY09
0004—LTM—$175,000 for FY010 to FY14
Total cost for options that have not been activated: $450,000

For the RA(O) enter $92K for FY07, $92K for FY08, and $91K for FY09
For the LTM enter $35K for each of the years from FY10 to FY14

Once these options have been activated, they must be entered in the database of record as obligated funds in the fiscal year the option was awarded.

Memo prepared by: John Brown (757) 124-4567 John Brown 10/3/05
SIGNATURE DATE

Memo reviewed by: Hank Jones (757) 124-4567 Hank Jones 10/3/05
SIGNATURE DATE

Example 5: Estimates Developed With Multi-Year Fixed Price Contracts (Continued)

SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS
OFFEROR TO COMPLETE BLOCKS 12, 17, 23, 24, AND 30

1. REQUISITION NUMBER: W81W25-4049-7800

PAGE 1 OF 77

2. CONTRACT NO.	3. AWARD/EFFECTIVE DATE	4. ORDER NUMBER	5. SOLICITATION NUMBER	6. SOLICITATION ISSUE DATE
	16-Aug-2004	W911S0-04-F-0029		

7. FOR SOLICITATION INFORMATION CALL:	a. NAME	b. TELEPHONE NUMBER (No Collect Calls)	8. OFFER DUE DATE/LOCAL TIME

9. ISSUED BY	CODE	10. THIS ACQUISITION IS	11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED	12. DISCOUNT TERMS
TEL: FAX:		[X] UNRESTRICTED [ ] SET ASIDE: % FOR [ ] SMALL BUSINESS [ ] SMALL DISADV. BUSINESS [ ] 8(A) SIC: SIZE STANDARD:	[ ] SEE SCHEDULE [ ] 13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700) 13b. RATING 14. METHOD OF SOLICITATION [ ] RFQ [ ] IFB [ ] RFP	NET 30 DAYS

15. DELIVER TO	CODE	16. ADMINISTERED BY	CODE
US ARMY ENVIRONMENTAL CENTER DOUG SCARBOROUGH BUILDING E4460 ABERDEEN PRO			

17a. CONTRACTOR/ OFFEROR	CODE	FACILITY CODE	18a. PAYMENT WILL BE MADE BY	CODE
TEL. 410-612-6350				

[ ] 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER

18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a. UNLESS BLOCK BELOW IS CHECKED [ ] SEE ADDENDUM

19. ITEM NO.	20. SCHEDULE OF SUPPLIES/ SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
	SEE SCHEDULE				

25. ACCOUNTING AND APPROPRIATION DATA	26. TOTAL AWARD AMOUNT
See Schedule	**$782,000**

[ ] 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1. 52.212-4. FAR 52.212-3. 52.212-5 ARE ATTACHED. ADDENDA [ ] ARE [ ] ARE NOT ATTACHED

[ ] 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA [ ] ARE [ ] ARE NOT ATTACHED

28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN COPIES	29. AWARD OF CONTRACT: REFERENCE
[ ] TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED HEREIN.	[ ] OFFER DATED . YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS:

30a. SIGNATURE OF OFFEROR/CONTRACTOR	31a. UNITED STATES OF AMERICA (SIGNATURE OF CONTRACTING OFFICER)	31c. DATE SIGNED
	[signature]	26-Aug-2004

30b. NAME AND TITLE OF SIGNER (TYPE OR PRINT)	30c. DATE SIGNED	31b. NAME OF CONTRACTING OFFICER (TYPE OR PRINT)
		Robert M. Winne Jr / Contracting Officer TEL: 757-878-3166 ext 3288 EMAIL: robert.winne@eustis.army.mil

32a. QUANTITY IN COLUMN 21 HAS BEEN	33. SHIP NUMBER	34. VOUCHER NUMBER	35. AMOUNT VERIFIED CORRECT FOR
[ ] RECEIVED [ ] INSPECTED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS NOTED	[ ] PARTIAL [ ] FIN		

32b. SIGNATURE OF AUTHORIZED GOVT. REPRESENTATIVE	32c. DATE	36. PAYMENT [ ] COMPLETE [ ] PARTIAL [ ] FINAL	37. CHECK NUMBER
		38. S/R ACCOUNT NUMBER	39. S/R VOUCHER NUMBER
41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT		42a. RECEIVED BY (Print)	40. PAID BY
41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER	41c. DATE	42b. RECEIVED AT (Location)	
		42c. DATE REC'D (YY/MM/DD)	42d. TOTAL CONTAINERS

AUTHORIZED FOR LOCAL REPRODUCTION

STANDARD FORM 1449 (10-95)
Prescribed by GSA
FAR (48 CFR) 53.212

Example 5: Estimates Developed With Multi-Year Fixed Price Contracts (Continued)

Section SF 1449—CONTINUATION SHEET

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		30,000	Dollars, U.S.	$1.00	$30,000.00
	RD FFP Remedial Design (RD) PURCHASE REQUEST NUMBER: Q1234X5-1235-7890				
				NET AMT	$30,000.00
	ACRN AA Funded Amount				$30,000.00

FOB: Destination

Section SF 1449—CONTINUATION SHEET

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002		302,000	Dollars, U.S.	$1.00	$302,000.00
	RA FFP Remedial Action (RA) PURCHASE REQUEST NUMBER: Q1234X5-1235-7890				
				NET AMT	$302,000.00
	ACRN AA Funded Amount				$302,000.00

FOB: Destination

Example 5: Estimates Developed With Multi-Year Fixed Price Contracts (Continued)

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003		275,000	Dollars, U.S.	$1.00	$275,000.00
OPTION	RA(O) FFP Remedial Action—Operations (RA(O)) PURCHASE REQUEST NUMBER: Q1234X5-1235-7890				
				NET AMT	$275,000.00
	Funded Amount				$0.00

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004		175,000	Dollars, U.S.	$1.00	$175,000.00
OPTION	LTM FFP Long-Term Management (LTM) PURCHASE REQUEST NUMBER: Q1234X5-1235-7890				
				NET AMT	$175,000.00
	Funded Amount				$0.00

FOB: Destination

Example 5: Estimates Developed With Multi-Year Fixed Price Contracts (Continued)

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0001	N/A	N/A	N/A	Government
0002	N/A	N/A	N/A	Government
0003	N/A	N/A	N/A	Government
0004	N/A	N/A	N/A	Government

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
0001	24-SEP-2004	30,000	US ARMY ENVIRONMENTAL COMMAND REMEDIAL PROJECT MANAGER BUILDING E4460 ABERDEEN PROVING GROUND MD 21010-5401 410-436-XXXX FOB: Destination	Q1234X5
0002	POP 01-OCT-2005 TO 30-SEP-2006	302,000	(SAME AS PREVIOUS LOCATION) FOB: Destination	Q1234X5
0003	N/A	N/A	N/A	N/A
0004B	N/A	N/A	N/A	N/A

ACCOUNTING AND APPROPRIATION DATA

AA: 21420200000422340049300814000 2514ENVR00 Q1234X5-1235-78904V2043S18001
AMOUNT: $332,000.00

CLAUSES INCORPORATED BY REFERENCE

52.232-33	Payment by Electronic Funds Transfer—CentralOCT 2003 Contractor Registration

Example 5: Estimates Developed With Multi-Year Fixed Price Contracts (Continued)

CLAUSES INCORPORATED BY FULL TEXT

PERFORMANCE WORK STATEMENT

ATTACHMENT A: INSTALLATION AND SITE INFORMATION

ATTACHMENT B: PROJECT DELIVERABLES

ATTACHMENT C: REFERENCE DOCUMENTS

ATTACHMENT D: LIST OF ACRONYMS

ATTACHMENT E: DEFINITIONS

SPECIAL PROVISIONS

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APPENDIX 9

CREATING THE .MDB FILE FOR UPLOAD TO THE DATABASE OF RECORD

Export the Installation (right click on the Folder in RACER and Select “Export Project(s)” from the menu). Assign a file name other than the default (e.g., change from RacerExpImp.mdb to CampIRPSpr06.mdb) and select the location for this file so it can be retrieved later. Select all projects by holding down the shift key, clicking on each project to be included in the export file, click “OK.” In the subsequent screens click “OK.”

To check if a valid installation export was created, try importing the file back into RACER. To import the installation export, right click on the Folder in RACER and select “Import Project(s)” from the menu and select the file just created, click “Open.” On subsequent screens select the sites to import (holding the shift key down to select multiple sites) and click “OK.” For preference selection, click “OK.” Click “Yes” for compacting database prior to copying for backup. Click “Yes” for “system data will be overwritten with import data. Continue?” Click “Yes” for “Level names data will be overwritten with import data. Continue?” Click “Close.” Check the selected folder in RACER to see if the projects were imported.

If this file can be imported back into RACER, the installation export file created is valid and ready to load into the database of record. To upload into database of record, delete the existing .mdb file in the database of record on the Funding Information/Cost Estimate and Requirements page and upload the new .mdb file from the location where it was saved.

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APPENDIX 10

EXAMPLE COST REPORTING

Costs not adjusted for inflation in the out years

Table 10-1 shows an example of costs that have not been adjusted for inflation in the out years. The recurring annual monitoring cost $10,000 for LTM in FY 2006 is the same as reported in the out years—it has not been adjusted for inflation.

Table 10-1. Example of Costs Not Adjusted for Inflation in the Out Years

Phase	Status	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012
LTM	Future	10	10	10	10	10	10	10

Costs reported in a current year basis

Historical costs must be reported in current dollars. Table 10-2 provides an example of updating FY 2000 costs for LTM to FY 2006 dollars. The LTM reported in FY 2000 is adjusted to current dollars by multiplying the adjusted cost by the escalation rate factor. The $10,000 cost for LTM from FY 2000 would be approximately $10,795 in FY 2006 dollars. The $10,795 would be the current year costs that would be entered into the database.

Escalation rate factors will be provided during the data call.

Table 10-2. Example of Costs Reported in Current Year Dollars

Year	Amount	Escalation rate factor	Cost Adjusted to FY06 $
2000	$ 10,000	1.0795	$ 10,795
2001	$ 10,000	1.0604	$ 10,604
2002	$ 10,000	1.0519	$ 10,519
2003	$ 10,000	1.0416	$ 10,416
2004	$ 10,000	1.0282	$ 10,282
2005	$ 10,000	1.015	$ 10,150
2006	$ 10,000	1.000	$ 10,000

Overseas installations must contact Resource Management personnel for country-specific escalation and currency conversion factors.

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APPENDIX 11

EXAMPLE SITE APPROVAL AND QC CHECKLIST

INSTALLATION	Site	Site	Site
	CCFTK-001	CCFTK-002	CCFTK-003
1. General Information—Does the Site/Historic narratives contain the following?			
a. Site Conditions (e.g. soil, groundwater)			
b. Type contamination			
c. Contaminant levels			
d. Correct Law, reg, order, statute, or driver mandating cleanup			
e. Proposed Cleanup strategy			
f. Identify key documents supporting the strategy (if they exist)			
g. Past uses, types of activities (processes), and occupants			
h. Environmental history (e.g. investigations, known releases, sampling, cleanup actions, closures)			
2. Remedial Actions			
a. Do the remedial actions make sense?			
b. Do the remedial actions address what was discussed in the narrative?			
c. Are they consistent with the phase schedules?			
3. Phase Schedule			
a. Is it reasonable and achievable (studies relative to the actions)?			
b. Is it consistent with the funding spread and remedial actions (i.e., dates correct)?			
c. Is it consistent with the cleanup strategy in the narrative?			
4. Cost Estimate & Requirements			
a. Has correct Estimate Source been identified?			
b. Have material changes (cost change +/- 10%) been adequately explained? (if applicable)			
c. Have zero cost estimates been explained? (if applicable)			
d. Has an adequate CTC source document been uploaded?			
e Is it complete and legible and does it support the estimate?			
f. If RACER was used, was the .mdb file uploaded correctly?			
g. Were obligations entered?			
5. Memorandum for Record (MFR)			
a. Does the MFR support the estimate and explain assumptions?			
b. Does the MFR have two signatures?			

APPENDIX 11 (Continued)
Example Site Approval and QC Checklist

INSTALLATION	Site	Site	Site
	CCFTK-001	CCFTK-002	CCFTK-003
c. Does the MFR contain and explain the following:			
1. background information			
2. disposal/cleanup strategy			
3. calculation summary (clearly explains any calculations done to complete estimate)			
4. quantities (e.g. cubic yards)			
5. cost per unit (major cost elements)			
6. other cost elements (utilities, etc.) (if applicable)			
7. major project changes (if applicable)			
8. cost adjustments (if applicable)			
6. Supervisory Review Checklist			
a. Is a supervisory review checklist attached, legible, signed, and dated?			
b. Are the correct sites and Site IDs listed?			
7. Program Management Costs			
a. Have the Program Management Costs been entered?			
b. Do they look reasonable (e.g., 8-10% of annual costs)?			

Signature:_____ Date: _____

Signature:_____ Date: _____

APPENDIX 12

QUALITY ASSURANCE SELECTION PROCEDURES

INFORMATION PAPER

SFIM-AEC-CDP
DATE

SUBJECT: Selecting Installations for Cost-to-Complete (CTC) Quality Assurance Reviews

1. Purpose: Describe procedures used to select installations for the FYXX CTC Quality Assurance Reviews.

2. Discussion:

a. On 22 Jan 02, the US Army Environmental Command (USAEC) implemented the Army's CTC Quality Assurance Program. An effective Quality Assurance Program implemented in accordance with estimating guidance and accounting standards provides reasonable assurance that cost estimates are completed with appropriate standards.

b. For FYXX, as indicated in the Army's Chief Financial Officer Strategic Plan tasks, the USAEC will continue with quality assurance reviews at XX(number) installations.

3. Selection Criteria:

The following protocol will be used to determine sites selected for review:

a. Installations included in the DoDIG audit of the Army FY 2002 financial statements.

b. Installations with CTC delta greater than 10 percent in FY XXXX.

c. Installations included in the Army's top 10 CTC installations.

d. Installations with sites containing remedial action costs greater than $5M scheduled for execution in FY XXXX or FY XXXX.

e. Installations that have not been reviewed by USAEC since the implementation of the CTC Quality Assurance Program.

f. BRAC installations identified during the FYXX Quality Control process.

Action Officer: JOE SCHMOE, 410-436-1619
Approved By: BUFORD BOSSY, COL, CM, CDR/USAEC

APPENDIX 12 (Continued)

FYXXXX Quality Assurance Review and Validation Procedures

INFORMATION PAPER

SFIM-AEC-CDP
DATE

SUBJECT: Criteria for Cost-to-Complete Quality Assurance Reviews

1. Purpose: Describe procedures for review and validation of CTC documentation.

2. Discussion:

a. On 22 Jan 02, the US Army Environmental Command (USAEC) implement the Army's CTC Quality Assurance Program. An effective Quality Assurance Program implemented in accordance with estimating guidance and accounting standards provides reasonable assurance that cost estimates are completed within appropriate standards.

b. For FYXXXX, as indicated in the Army's Chief Financial Officer Strategic Plan tasks, the USAEC will continue with quality assurance reviews at XX (number) installations.

3. CTC Reviews:

a. The CTC Reviews will be on or after DATE. The reviews will test and determine if estimates are meeting estimating and accounting standards.

b. The FY XXXX CTC Detail Sheet will be used as the basis for conducting the review. Reviews will address the following issues:

(1) Is sound estimating methodology used and are the assumptions used reasonable?
(2) Did the estimator compare prior year estimates to the current year estimates?
(3) Does the estimate include all relevant phases and costs to complete the cleanup?
(4) Is the estimate consistent with the operational plans of the Army?
(5) Is the estimator qualified and has the required training to perform the estimate completed?
(6) Is there an adequate audit trail?
(7) Is there adequate documentation to support the underlying assumptions made to develop the estimate?
(8) Does the supervisor agree with the underlying assumptions made to develop the estimate?
(9) Is the estimate maintained in the current cost basis?

4. The results of each CTC Review will be documented. Deficiencies identified will be forwarded to the installation through the appropriate chain of command. Actions taken in response to USAEC findings will be maintained for audit review.

Action Officer: JOE SCHMOE, 410-436-1619
Approved By: BUFORD BOSSY, COL, CM, CDR/USAEC