

# CHAPTER 3

## STAGES OF PROJECT DEVELOPMENT

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### 1. INTRODUCTION

Estimates are produced throughout the life of a project at various stages. It is important to understand the stages of project development in order to understand how they relate to the various estimates. Chapter 4 describes the various estimates and their relationship to each other as well as to the key decisions. All projects, whether they are conventional construction or Environmental Management (EM), evolve through a series of stages. Both types of projects originate with preliminary study and then follow a series of design stages. Finally, the design is implemented in the form of a finished product.

Regardless of the finished product, all projects will require management and support activities throughout the life of the project. Major differences between these two types of projects are observed in the study and design phases. EM projects tend to have more intricate study and design phases than those of conventional construction projects. Also, EM projects are unique in that each complete project is divided into two parts: assessment and cleanup. Each part of an EM project is comprised of a complete cycle of study, design, and implementation; hence, the cycle is completed twice for the completion of a single project, whereas the cycle is only completed once for construction projects. A comparison of activities involved in conventional construction and EM projects is provided in Table 3-1. Also included is Table 3-2, Comparison of EM Project Phases to conventional construction phases.

### 2. RELATIONSHIP OF STAGES OF DEVELOPMENT TO TYPES OF ESTIMATES

The development of a project occurs in three major stages: study, design, and implementation. As a project develops, more information and specifications are required,

**TABLE 3-1**  
**EM AND CONVENTIONAL CONSTRUCTION**  
**TERMINOLOGY CROSSWALK**

	<b>DOE ASSESSMENT AND CLEANUP PHASE TERMINOLOGY</b>	<b>4700.1 TERMINOLOGY CONVENTIONAL CONSTRUCTION</b>
<b>STUDY</b>	Preliminary Assessment  Inspection	Development Phase  Conceptual Design Report
<b>DESIGN</b>	Characterization  Evaluation of Cleanup Alternatives	Title I  Title II
<b>IMPLEMENT</b>	Cleanup Action  Compliance	Construction/Title III  Operations

resulting in more estimates than were included in the previous stage. These estimates become a more accurate representation of the actual project cost. In the following, a description of conventional construction terminology will be discussed in relation to the project stages of development and their estimates.

#### **A. Study Stage**

The study stage consists of a development phase and a conceptual design report (CDR). Investigations and studies are conducted to compile the information that is essential for the design stage. Through these investigating processes, planning feasibility study estimates are derived for preliminary budget estimates of total project cost on the basis of any known research and development requirements. This preliminary phase establishes the scope, feasibility, need, and activities included in

the CDRs, which results in a budget/conceptual design estimate, which is used to request congressional authorization for funding.

#### **B. Design Stage**

The design stage consists of the Title I and the Title II phases. The Title I (preliminary) design phase defines the project criteria in greater detail, permitting the design process to proceed with the development of alternate concepts and a Title I design summary. The approved Title I concept and the supporting documentation prepared for Title I form the basis of all activity in the definitive phase, Title II of project design. Title II incorporates all the restudy and redesign work, the final specifications and drawings for bids from contractors, and the construction cost estimator along with analyses of health and safety factors. Moreover, the coordination of all design elements and local and government agencies is also included.

The Title I and Title II phases are used to prepare the most accurate estimate possible prior to competitive bidding and construction. Title I estimates shall include all items referred in the CDR estimate basis. The Title II estimate uses the Title II design for its basis. The Title II estimate may be used for the government's estimate.

#### **C. Implementation Stage**

The implementation stage consists of construction, Title III, and operational phases. This is the time during which actual work and operations are performed. Current working estimates are required throughout the life of the project for cost control. These estimates reflect the most recent cost and data design available, the estimated cost to complete, the allowance for contingency, detailed contingency analysis, and the uncertainties remaining in the project.

#### **D. EM and Conventional Construction Stages**

The terminology of EM and conventional construction stages may differ, but the same basic structure of project development is evident as depicted in Table 3-1, which compares the stages of a project using DOE Order 4700.1, PROJECT MANAGEMENT SYSTEM, terminology with one using EM terminology.

### **3. NATIONAL ENVIRONMENTAL POLICY ACT ACTIVITIES**

The stages of project development will include a number of engineering and scientific studies that address design, technical, and regulatory issues. Environmental assessments (EAs) are conducted to meet the requirements of the National Environmental Policy Act (NEPA). The objective of an EA is to determine if a proposed action or project will have a significant impact on the environment, to assess that impact, and to identify alternatives.

In conventional construction, this step occurs in the Pre-Title I phase of project development. For EM projects, this step occurs in the latter part of the assessment phase.

#### **A. Environmental Assessments**

The objective of an EA is to determine if a proposed action will have a significant impact on the environment and to assess that impact. If an EA results in a finding of no significant impact (FONSI), a notice is published in the Federal Register to that effect. If there is a significant impact or if there are objections to the FONSI, an environmental impact statement (EIS) may be required. An EA can include the following elements of work.

1. Planning and coordination of the EA process, in which potential sources of data are identified and the scope of the proposed action is reviewed.
2. Inventory of natural, human, and cultural resources based on existing sources of information. Typical elements of the resource inventory include geology, hydrology, vegetation, wildlife, threatened and endangered species, air quality, land use (existing and planned), visual characteristics, socioeconomic character, and acoustic conditions. Cultural resources include archaeological sites, historical sites, sites with religious or social significance, and other structures or areas with cultural significance.
3. Impact assessment and mitigation planning, in which the proposed action is evaluated to determine the impact on the resources identified in the inventory. Appropriate mitigation measures are identified where it is possible to make adjustments in the proposed action that reduce or eliminate impacts.
4. Participating in agency reviews of the EA and responding to questions and comments.
5. Preparing an EA, including decision documents.

When the NEPA process is successfully concluded with an EA, other environmental permitting actions may follow, such as preparation of a prevention of significant deterioration (PSD) permit under the Clean Air Act. If a FONSI cannot be obtained, an EIS is required.

#### **B. Environmental Impact Statements**

EISs are prepared to meet the requirements of the NEPA whenever an EA does not result in a FONSI. The objective of an EIS is to evaluate any major federal action that is proposed that has the potential for significant environmental impact and to provide a forum for a public decision making process regarding the action. An EIS can include the following elements of work.

- EIS scoping in which the general technical approach is agreed upon and the public involvement program is initiated. Potential sources of data are identified and the scope of the proposed action, as well as any known alternatives, is reviewed.
- Inventorying natural, human, and cultural resources based on existing sources of information. Typical elements of the resource inventory include geology, hydrology, vegetation, wildlife, threatened and endangered species, air quality, land use (existing and planned), visual characteristics, socioeconomic character, and acoustic conditions. Cultural resources include archaeological sites, historical sites, sites with religious or social significance, and other sites with cultural significance.
- Impact assessment and mitigation planning, in which the proposed action is evaluated to determine the impact on the resources identified in the inventory. Appropriate mitigation measures are identified where it is possible to make adjustments in the proposed action that reduce or eliminate impacts. Alternatives to the proposed action, including “no action,” are considered to evaluate the impact on the environment. The impact of the proposed action is compared to the impact of the other alternatives.
- Preparing a draft EIS and distributing that report to all interested parties including elected officials, citizen groups, and the public.
- Participating in agency reviews and public hearings regarding the draft EIS and responding to questions and comments.
- Preparing a final EIS including all comments and the responses to those comments.
- Preparing decision documents required for a record of decision (ROD).

When the NEPA process is successfully concluded with an EIS, other environmental actions may follow, such as permit preparation.

#### **4. STUDY PHASE ACTIVITIES**

Preliminary phase activities consist of studies and investigations. These studies and investigations must be conducted to gather the information that is necessary for the design phase.

##### **A. Pre-Title I Activities**

Pre-Title I activities are defined in a variety of DOE references as all activities taking place prior to the start of the preliminary design. This includes siting and related engineering studies conducted to establish project scope, feasibility, need, etc., as well as all activities that produce formal deliverables, such as CDRs. Pre-Title I activities shall be funded from the operating expense budget.

## **B. Assessment - Environmental Management**

Assessment is the technical activity of an engineering, scientific, or regulatory nature that is required to establish scope, meet regulatory requirements, or evaluate alternatives for a task. This will include preliminary assessment/site inspection (PA/SI), facilities investigation/corrective measures study (FI/CMS), remedial investigation/feasibility study (RI/FS), and any other pre-cleanup design activities performed in support of a particular activity.

The environmental restoration program scope will include a large number of engineering and scientific studies, as well as activity and program management that address design, technical, and regulatory issues not encountered on conventional construction projects. These have been grouped into legal categories that establish the general requirements for each.

### **1. Comprehensive Environmental Response Compensation and Liability Act (CERCLA): Preliminary Assessment/Site Inspection**

PA/SI is the first phase of work for sites being remediated under CERCLA and is comparable to the development phase of construction. The objective of this effort is to identify potential release sites for future study and to rank the hazard according to a U.S. Environmental Protection Agency (EPA) methodology called the Hazard Ranking System (HRS) from existing data and cursory inspection. PA/SI includes the following elements of work:

- review of existing data concerning past operating practices including waste disposal, operations involving potentially hazardous materials, and spills or similar incidents;
- review of existing data concerning the natural setting, such as geology, hydrogeology, surface water, flora, and fauna;
- analysis of existing data to assess completeness and determine if there is a need for sampling;
- site visit to confirm site location and relationships with major features;
- limited sampling and analysis where warranted;

- evaluation of the hazard posed using the HRS; and
- preparation of a PA/SI report.

## **2. Resource Conservation and Recovery Act (RCRA): Facility Assessment**

A RCRA facility assessment (RFA) is the first step undertaken at a suspected hazardous waste site that is regulated under RCRA and is comparable to the development phase of construction. The objective is to review operations and identify potential sources of release for further investigation. An RFA can include the following elements of work:

- develop an facility assessment (FA) workplan, submit the plan to regulatory agencies for comments, and incorporate comments;
- review historical data concerning present and past operations including any known spills or other unusual events;
- identify all solid waste management units (SWMUs) on the site;
- conduct technical investigations necessary for the identification of a potential for an occurring or past release (POPR);
- prepare a POPR report; and
- identify the need for interim corrective measures to contain or eliminate sources of continuing releases.

## **5. DESIGN ACTIVITIES**

Following the preliminary phase activities are the design activities. The basic stages of design activities are discussed below.

### **A. Conventional Construction**

Design activities for conventional construction projects are divided into two categories: Title I design and Title II design.

#### **1. Title I (Preliminary) Design**

Title I is the preliminary stage of project design. In this phase, the design criteria are defined in greater detail to permit the design process to proceed with the development of alternate concepts and a Title I design summary, if required.

As detailed in DOE Order 4700.1, PROJECT MANAGEMENT SYSTEM, Title I includes the following elements of work:

- design studies, including alternate design approaches, energy conservation evaluations, and analysis or review of health, safety, and environmental aspects of the project;
- review of the project design criteria to develop greater detail and to incorporate any design modifications that may result from engineering studies conducted in Title I;
- preliminary design drawings showing the proposed design and any alternates in sufficient detail to establish the design features of each approach and to permit a preliminary estimate to be made of the construction cost;
- outline specifications for construction and specifications for equipment procurement; identification of long lead time items for advance procurement;
- preliminary safety analysis report (PSAR) if not included in the CDR;
- preliminary cost estimate based on the approved design and other such estimates as required to support the evaluation of alternate designs prepared during preliminary design (Title I);
- preliminary project schedule based upon information available during preliminary design (Title I).

Title I activities are funded from the Plant and Capital Equipment (PACE) Fund (engineering, design, and inspection (ED&I)).

## **2. Title II (Detailed) Design**

Title II is the definitive stage of project design. The approved Title I concept and the supporting documentation prepared for Title I form the basis of all activity in Title II. As detailed in DOE Order 4700.1, PROJECT MANAGEMENT SYSTEM, Title II design includes the following elements of work:

- restudy and redesign work required to incorporate changes from the design prepared in Title I;
- final drawings, specifications, and test plans, suitable for soliciting bids from contractors;



- construction cost estimates;
- analyses of health, safety, environmental, and other project factors that may impact the project, as directed by the contracting officer;
- coordination of all design elements with other project features, such as utilities, government-furnished equipment, and portions of the project or related projects being designed by others; and
- attendance at all meetings scheduled for design review or coordination with the DOE, the management and operating (M&O) contractor, and local agencies, such as public utilities.

Title II activities are funded from the PACE Fund (ED&I).

## **B. Environmental Management**

### **1. CERCLA: Remedial Investigation/Feasibility Study**

RI/FS is the investigation phase of assessment under CERCLA and is comparable to the CDR phase of construction. During remedial investigation (RI), quantitative methods of cleanup are developed and compared, and a preferred method is selected for implementation. RI/FS ends when a ROD is reached.

Remedial investigation can include the following elements of work:

- review of information collected in the PA/SI and applicable regulations;
- development of an RI/FS work plan, including a sampling and analysis plan, a quality assurance project plan, and a health and safety work plan;
- field sampling and laboratory analysis;
- evaluation of data from field sampling and data analysis;
- preparation of risk assessment reports including identification of source terms, identification and analysis of pathways and exposure scenarios, identification of receptors, and toxicological assessment.

The feasibility study (FS) can include the following elements of work:

- screening of cleanup technologies for suitability;

- screening of process options for cleanup considering waste character, site conditions, regulatory considerations, and other factors;
- conducting an endangerment assessment;
- developing and evaluating alternatives for cleanup, including preparation of conceptual designs, schedules, and feasibility estimates;
- conducting treatability studies to establish the effectiveness of selected treatment alternatives;
- preparing a feasibility study report (FSR) presenting the results of the FS, including the results of cleanup technology screening, process options evaluation, alternative evaluation, regulatory review, and treatability studies;
- responding to comments from regulatory agencies and the public;
- preparing a ROD.

## **2. RCRA Facility Investigation/Corrective Measures Study**

A facility investigation under RCRA is comparable to a remedial investigation under CERCLA and the CDR phase of construction. The objective of this effort is to characterize the natural environment, the nature of any hazardous materials that may be present, and identify technologies that will be needed to implement corrective measures. A RCRA facility investigation (FI) can include the following elements.

- Development of an FI workplan, submittal of the plan to regulatory agencies for comments, and incorporation of subsequent comments. The work plan typically includes such elements as data management, health and safety, and project management.
- Field investigation, analysis, and research needed to develop a complete description of the regional setting including climatic conditions.
- Field investigation, sampling, modeling, and analysis required to characterize the extent of any release of hazardous material that may have occurred.
- Field investigation, sampling, modeling, and analysis required to describe the site hydrogeology, geology, soil conditions, and surface water hydrology.

- Performance of a health risk analysis, including quantification of source terms, identification and evaluation of pathways, identification of receptors, and toxicological evaluation of dose response relationships for the affected populations.
- Development of a community relations program and implementation of elements of that plan consistent with plan requirements for the FI.
- Identification of potential technologies to be employed in corrective measures.

A CMS develops and evaluates alternatives for corrective measure implementation. A CMS can include the following elements of work:

- develop a CMS workplan, including submittal of that workplan to regulatory agencies for review, comment, and incorporation of subsequent comments;
- screen cleanup technologies for suitability;
- screen process options for cleanup considering waste characteristics, site conditions, regulatory requirements, and other factors;
- develop and evaluate alternatives for cleanup, including preparation of conceptual designs, schedules, and feasibility estimates;
- conduct treatability studies to establish the effectiveness of selected treatment alternatives;
- prepare a CMS report presenting the results of the cleanup technology screening, process options evaluation, alternative evaluation, regulatory review, and treatability studies;
- respond to comments from regulatory agencies and public comments; and
- prepare a consent order or permit modification.

### **C. Cleanup**

Engineering design for the cleanup will be performed on the basis of the method identified in the ROD (CERCLA) or permit (RCRA). The activities that encompass cleanup design are preliminary design, detailed design, and engineering during construction. The initial phase of cleanup design is referred to as preliminary design because engineering alternatives are being developed and evaluated. In some cases, this phase may be shortened or eliminated entirely if no alternatives can be identified

within the scope of the ROD or permit. The second phase of cleanup design is definitive design, in which a single alternative is carried to completion.

## **6. IMPLEMENTATION OF DESIGN**

Once design activities are complete, the next stage is implementation of design.

### **A. Conventional Construction**

Implementation of design for conventional construction projects is simply the building of the facility. Construction activities are funded from the PACE Fund (construction).

### **B. Environmental Management**

The implementation of assessments follows the completion of the first cycle of stages of an EM project and the beginning of the next cycle of stages (i.e., the cleanup part of the EM project). At this point in the project's life, the cycle begins again for cleanup.

### **C. Cleanup**

Engineering design for the cleanup will be performed on the basis of the method identified in the ROD (CERCLA) or permit (RCRA). The activities that encompass cleanup design are preliminary design, detailed design, and engineering during construction. The initial phase of cleanup design is referred to as preliminary design because engineering alternatives are being developed and evaluated. In some cases, this phase may be shortened or eliminated entirely if no alternatives can be identified within the scope of the ROD or permit. The second phase of cleanup design is definitive design, in which a single alternative is carried to completion.

All equipment, labor, and materials required to install a remedy are considered part of cleanup construction. Construction can consist of the following activities:

- site modifications (e.g., installation of containment systems, excavation of contaminated and uncontaminated materials, site preparation for installation of equipment);
- demolition of existing structures;
- installation of equipment (e.g., construction of pumping systems; construction required for installation of treatment systems; installation of testing and monitoring equipment); and

- surface controls (e.g., erosion control, site restoration).

## **7. PROJECT SUPPORT ACTIVITIES**

Throughout the life of a project, various support activities are required to ensure successful completion of the project. These activities are discussed below.

### **A. Project Management**

Project management covers those services provided to the DOE on a specific project, beginning at the start of design and continuing through the completion of construction, for planning, organizing, directing, controlling, and reporting on the status of the project. They are as follows:

- technical management and liaison with the designers, architect/engineers (A/Es) management, and M&O contractors during Title I, II, and III design;
- coordination, including interface control during design and construction;
- maintenance and operation of scheduling, estimating, and project control systems during design and construction;
- technical management and coordination of the construction manager and his support staff;
- overall management and coordination of the activities of non-dedicated project support personnel;
- technical management of review and approval activities conducted by dedicated management personnel;
- coordination of all aspects of the project; and
- preparation, revision, and related activities in support of the final safety analysis report.

Project management activities are funded from the PACE Fund (ED&I).

**TABLE 3-2**  
**COMPARISON OF EM PROJECT PHASES**

<b>DOE ASSESSMENT AND CLEANUP PHASE TERMINOLOGY</b>	<b>RCRA TERMINOLOGY ACTIVE FACILITIES</b>	<b>CERCLA TERMINOLOGY SUPERFUND/ INACTIVE FACILITIES</b>	<b>DECOMMISSIONING &amp; DECONTAMINATION TERMINOLOGY RADIOACTIVE/ INACTIVE FACILITIES</b>
Preliminary Assessment	RCRA Facility Assessment	Preliminary Assessment	Included in Characterization
Inspection	Included as a part of RCRA Facility Assessment	Site Inspection	Included in Characterization
Characterization	RCRA Facility Investigation	Remedial Investigation	Characterization
Evaluation of Cleanup Alternatives	RCRA Corrective Measures Study  NEPA Environmental Review	Feasibility Study ROD  NEPA Environmental Review	NEPA Environmental Review ROD or FONSI
Cleanup Action	RCRA Corrective Measures Implementation (CMI)	Remedial Design Remedial Action	Engineering and Operation
Compliance	Postclosure Monitoring	Operation and Maintenance	Postdecommissioning

## **B. Construction Management**

Construction management (CM) covers those services provided by the organization responsible for management of the construction effort during Title I and Title II design and continuing through the completion of construction. CM services are further defined in DOE Order 4700.1. Typically, CM includes—

- reviewing and approving construction packages;
- reviewing and acceptance of construction test procedures;
- control of field design change requests; and
- supporting the construction contractor by furnishing general condition items not provided in the bid package, such as security, temporary facilities, debris removal, and other similar project requirements not included in the bid package.

All costs associated with CM shall be charged against PACE Fund (Construction).

## **C. Construction Management for Environmental Management Projects**

CM includes those activity management services required to manage construction or cleanup activities, including review and approval, cleanup bid package review and acceptance of construction test procedures, control of field design change requests, and review and approval of contractor pay requests. The construction manager provides items and services not included in the construction contractor's bid package, such as debris removal, temporary facilities, site security, and storage.

All of the above functions (program management, program support, activity management, and CM) will be charged directly to the Environmental Restoration Program to the extent allowed by DOE policy. When M&O contractors are providing program or activity management services, only those services will be charged to EM that are incremental and not covered under the operating contract, as required by DOE Order 2200.6, FINANCIAL ACCOUNTING.

Activity support services, which consist of activities performed by the M&O contractor for internal management and technical support of activities or programs but are within the scope of the operating contract, are not chargeable to the program. Examples of activity support services include establishment and maintenance of site programs for health, safety, quality assurance, legal affairs, training, and security.

Cost methods development (CMD) identifies several common elements applicable to EM that form the basis of allowance costs for project and program management.

- Construction management cost is rolled up into project management cost.
- Project management functions should be provided by full-time personnel to the greatest extent possible. This does not preclude the use of a matrix organization; however, DOE policy clearly prefers the use of full-time personnel assigned to the project wherever possible.

#### **D. Project Support**

Support covers those activities performed by the M&O contractor for internal management and technical support of the project manager (PM), including—

- document control;
- auditing of compliance with quality assurance, health physics, safety, and environmental requirements; and
- design review by non-dedicated M&O contractor personnel on an as-needed basis including: independent technical analysis, constructability review, life cycle cost comparisons, life safety review, health physics review, and code checks.

Project support is funded from the M&O contractor's expense budget.

#### **E. Startup**

Startup covers one-time costs incurred by the M&O contractor during the transition period between the completion of construction and operation of the facility. This includes the following activities:

- operations planning, operator training, and operational readiness review;
- startup coordination, post-acceptance testing, startup chemicals, and related supplies; and
- salaries of startup personnel.

Startup activities are funded from the Operating Expense Fund.

#### **F. Construction Engineering**

This phase of the activity begins when bid packages are assembled following detailed design and consists of engineering services during construction, including both office support and field services. The following elements of work are included under office support:



- review of all vendor drawings and submittals for conformance with the approved design drawings and specifications;
- review and evaluation of all proposed deviations for the original Detailed Design for conformance with regulatory requirements, codes, and standards;
- incorporation of all approved as-built record drawings for delivery to the activity manager; collection and maintenance of all construction related records;
- preparation of cost estimates to establish reasonable amounts of increase or decrease in contract price or schedule caused by design or procedure changes; evaluate proposals submitted by the cleanup contractor for reasonableness from the perspective of cost and schedule, and make recommendations to the activity manager;
- expedition of the procurement of material and equipment from suppliers, vendors, or fabricators;
- audits of vendors, suppliers, and subcontractors as required by the quality assurance program plan; and
- additional technical service, such as evaluation of site monitoring data, update of risk analyses, review of regulatory correspondence, participation at public meetings, and other similar activities.

The following elements of work are included under field services:

- furnishing and maintaining governing lines and benchmarks to prime horizontal and vertical controls to which construction may be referred;
- inspecting the construction contractor's workmanship, materials, and equipment and reporting on their conformance or nonconformance with the approved drawings and specifications;
- making or procuring such field or laboratory tests as are necessary to ensure that construction materials and practices are in accordance with the approved drawings and specifications;
- marking up field copies of the design drawings and specifications to show the as-built condition for submittal to the designer for incorporation into the as-built record drawings;
- providing input to construction progress reports as required; and

- verifying that planned quality control measures are implemented and evaluating the results of those measures to ensure that the work is being completed in accordance with the approved plans and specifications.

#### **G. Program Management**

Program management includes those services provided to the DOE on a specific program for planning, organizing, directing, controlling, budgeting, and reporting on the program. Program management will be provided as multiple levels within the EM program, including the Headquarters, operations office, and installation. Program management includes program support.

#### **H. Program Support**

Program support covers those activities performed for internal management and technical support of the program by part-time or full-time personnel. The following activities are illustrative of services included in this category:

- program document control;
- development of program plans and auditing of activity level functions for compliance with programmatic quality assurance, health physics, safety, environmental, and related requirements;
- design review or technical oversight of activity level functions by including independent technical analysis, constructability review, life cycle cost comparisons, life safety review, health physics review, and code checks;
- program level reporting, budgeting, and planning; and
- purchasing, contracting, and other functions required to obtain the services of outside contractors.

#### **I. Activity Management**

Activity management services are those provided to the EM Program on a specific activity beginning at the start of assessment and continuing through the completion of the cleanup. Activity management includes those services required to plan, organize, direct, control, and report on the activity. The cost of construction management is rolled up into activity management. The following functions are illustrative of services included in activity management:

- technical management and liaison with the designers during cleanup design;
- coordination, including interface control, during design and construction;

- maintenance and operation of scheduling, estimating, and activity control systems during design and cleanup;
- technical management and coordination of the construction management staff;
- overall management and coordination of the activities of non-dedicated activity support personnel;
- technical management of review and approval activities conducted by dedicated management personnel;
- coordination of all aspects of the activity; and
- preparation of activity plans, activity management plans, and quality assurance project plans.

**J. Environmental Restoration Management Contractor**

An environmental restoration management contractor (ERMC) is a contractor that manages and executes the Environmental Restoration Program at a particular site. The ERMC includes the prime contractor and any named member(s) of the ERMC team of subcontractors considered essential to the accomplishment of the work.