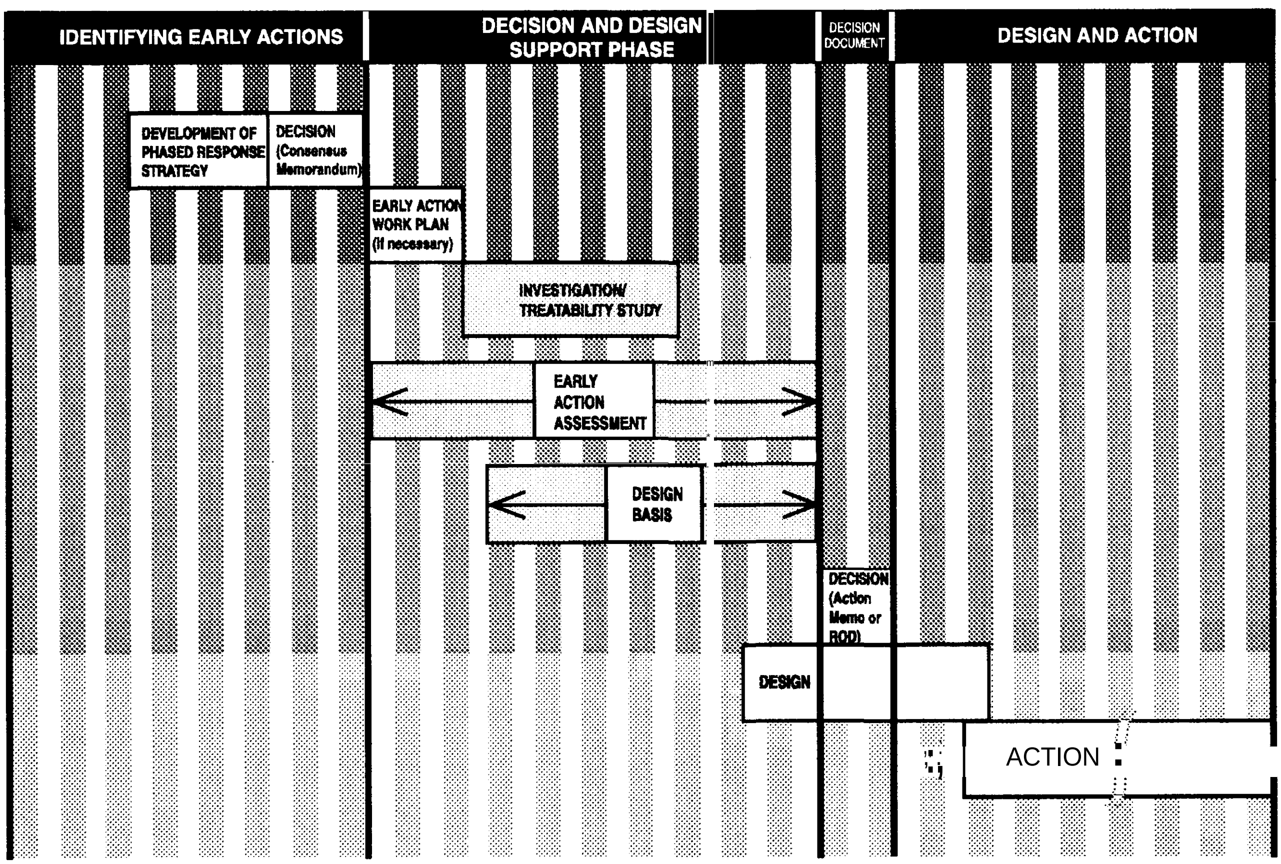
DOE/EH-0506

Environmental Guidance

Phased Response/ Early Actions



U.S. Department of Energy
Washington, D.C.

Office of Environmental Activities
(EM-22)

Office of Environmental Policy & Assistance
RCRA/CERCLA Division
(EH-413)

Module 4

Non-Time-Critical Removal Actions and Early Remedial Actions

Contents

Module 4. Non-Time Critical Removal Actions and Early Remedial Actions

Introduction

1 Phased Response Strategy

2 Contingent Removal Action Approaches

3 Time-Critical Removal Actions

4. Non-Time-Critical Removal Actions and Early Remedial Actions

4. Non-Time-Critical Removal Actions and Early Remedial Actions

4.1 Scoping

4.2 Limited Field Investigations

4.3 Preconceptual Design

4.4 EE/CA or FFS

4.5 Conceptual Design

4.6 Remedy Selection and Documentation

Module 4
Non-Time-Critical Removal Actions and Early Remedial Actions

Background

Early actions are used only to respond to agreed on problems. Longer term early actions (e.g., non-time-critical removal actions or early remedial actions) are used to address site problems that are more complex (e.g., difficult logistics, intricate technology) than time-critical removal actions. Still, if an early action is being considered, it is because everyone can agree there is a problem that requires near-term intervention. If there is any serious question whether or not the site problem(s) under consideration require action, (e.g., if you need to do a risk assessment to decide if the problem(s) require action) then the site problem(s) are not yet appropriate for an early action process and should be deferred until the comprehensive Remedial Investigation/Feasibility Study (RI/FS) process can support a decision to take action.

The early actions discussed in this module do not require the long investigations or the development and evaluation of a full range of remedial alternatives required in the comprehensive RI/FS process. The evaluations and even the documentation for these early actions should be abbreviated. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) even allows consideration of a single alternative where appropriate:

> *"Few alternatives, and in some cases perhaps only one, should be developed for interim actions. A completed baseline risk assessment generally will not be available or necessary to justify an interim action. Qualitative risk information should be organized that demonstrates that the action is necessary to stabilize the site, prevent futher degradations, or achieve significant risk reduction quickly. " (See* Note A of the Introduction for full text.)

The need to take action is established during development of the phased response strategy and in the consensus memorandum. This module assumes that qualitative risk information – sufficient to support the decision to take action-was provided prior to development of the consensus memorandum. This same qualitative risk information is included as part of the dmumentation for non-time-critical removal or early remedial action and will be important in helping to establish objectives.

The Introduction to this guidance describes the entire early action process as shown in Figure 1. This module addresses two of the major phases of the early action process: the Decision and Design Support Phase and the Decision Phase. The third major phase, Detailed Design and Action is beyond the scope of this document.

Organization

Some of the information in this module is distilled from fuller explanations in the DOE RI/FS guidance. Many issues dealt with briefly in this module appear in the DOE RI/FS guidance as fill submodules. Two design steps (i.e., Submodules 4.3, Preconceptual Design, and 4.5, Conceptual Design) have been integrated into the planning and decision process.

Module 4 is divided into six submodules

- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- 4.4 Engineering Evaluation/Cost Analysis or Focused Feasibility Study
- 4.5 Conceptual Design
- 4.6 Remedy Selection and Documentation

Submodule 4.1 Scoping

Non-Time-Critical Removal Actions and Early Remedial Actions

- **4.1 Scoping**
- **4.2 Limited Field Investigations**
- **4.3 Preconceptual Design**
- **4.4 EE/CA or FFS**
- **4.5 Conceptual Design**
- **4.6 Remedy Selection and Documentation**

4.1 Scoping

- **Evaluation of Site Understanding**
- **Establishing Specific Data Needs for the LFI**
- **Conducting Meeting of Extended Project Team**
- **Developing Early Action Work Plan**

Submodule 4.1 Scoping

Background

Scoping for the early action began during the development of the phased response strategy and was carried further in the development of the consensus memorandum. In fact, the consensus memormdum maybe the only scoping required for many early actions. However, the types of early actions covered in this module include rather significant actions, potentially involving millions of dollars in remediation costs. These more extensive (and expensive) actions require greater effort in scoping.

The appropriate level of scoping effort has to be decided for each site. Through the scoping step, the extended project team must accomplish the following:

- Develop a sufficient understanding of the site problems to allow adequate planning.

- Confirm the objectives and remedial responses tentatively established in the consensus memorandum, including the qualitative risk information that supports action.

- **If necessary, develop a work plan for the early action**

Organization

Submodule 4.1 discusses the following:

- **Evaluation of site understanding**
- **Establishing specific data needs for the limited field investigation (LFI)**
- **Conducting meeting of extended project team**
- **Developing early action work plan**

In addition, more detailed information is provided in the following notes:

- **Note A – Example Outline for a Site Problem Understanding Writeup**
- **Note B – Example ARARs**
- **Note C – Example Early Action Objectives**
- **Note D – Example Early Action Work Plan Issues**
- **Note E – Example LFI Work Plan Outline**

This page intentionally left blank.

Sources

1. U.S. EPA, May 1988, *CERCLA Compliance with Other Laws Manual (Draft),* OSWER Directive 9234.1-01.

2. U.S. EPA, August 1989, *CERCLA Compliance with Other Laws Manual, Volume 2, EPA/540/G-89/O09,* OSWER Directive 9234.1-02.

3. U.S. EPA, December 13, 1991, *Risk Assessment Guidance for Superfund: Volume 1 –Human Health Evaluation Manual (Part B: Development of Risk-Based Preliminary Remediation Goals),* OSWER Directive 9285 .7-OIB.

4. U.S. EPA, September 1993(a), *Data Quality Objectives Process for Superfund,* Interim Final, EPA/540/G-93/07 1, OSWER Directive 9355.9-01.

5. U.S. EPA, August 1993(b), *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA, EPA/540/R-93/057,* OSWER Directive 9360.0-32.

6. DOE, September 1994, *CERCLA Removal Actions, DOE/EH-0435.*

7. *40* CFR 300, March 8, 1990, *National Oil and Hazardous Substances Pollution Contingency Plan,* Federal Register, Vol. 55, No. 46 Rules and Regulations.

Submodule 4.1 Scoping

1
Start.

2
Evaluate site understanding.

Go to Submodule 4.1 Note A and to DOE RI/FS Guidance Submodule 1.2 Note A.

NOTE:
The goal should be to extract the maximum amount of understanding from the available data.

3
Establish specific data needs for the LFI.

Go to Submodule 4.1 Note B and Note C.

NOTE:
The consensus memorandum includes sufficient risk information to support the decision to take early action. Documentation of the risk evaluation will be part of site understanding.

Step 4 continued on next page.

Step 1. Start.

Step 2. **Evaluate site understanding.** The Department of Energy (DOE) internal project team (or extended project team, if appropriate) should visit the site to increase their understanding of the site problems and logistical issues. (See Submodule 1.2, Note A of DOE's RI/FS guidance for additional detail about items to include in the site visit.) This site visit may be particularly important for clarifying the boundaries/scope set in the consensus memorandum.

Available data are used for developing the initial understanding of the site conditions and site problems that will be addressed. Maximizing the use of available data avoids collection of additional data whenever possible.

Insufficient collection and interpretation of available data can result in overstatement of data needs or even in determining, incorrectly, that an early action is not feasible because of a lack of sufficient site understanding. The goal should be to extract the maximum amount of site understanding from the available data. An ongoing RI, an ongoing baseline risk assessment, or an existing RI/FS work plan for the entire operable unit (OU) should provide excellent sources of site information for an early action.

The results of the data collection and review should be briefly summarized in a description of site understanding, which can be used directly as Chapter 2 of the early action work plan. (See Step 6 below. Also see Submodule 4.1, Note A for an example outline of a site understanding writeup.)

All legitimate data needs for the early action process should support one or both of the two major activities of the decision and design support phase.

Step 3. **Establish specific data needs for the limited field investigation (LFI).** For those instances in which an LFI is required (see Submodule 4.2, Limited Field Investigations), the goal of this step is to develop a list of specific and carefully justified data needs. These specific data needs define the scope of the data collection effort.

Data that are not needed to support a decision or begin a design are usually unnecessary to the early action and probably should not be collected. Submodule 4.3, Preconceptual Design, provides details on necessary information for alternative(s) definition. Submodule 4.5, Conceptual Design, provides details on information required to support development of design criteria. Exceptions may involve stakeholder interests that are not directly relevant to these major activities or health and safety concerns for site workers during the remediation. In other instances, an LFI to support early actions may be a good opportunity for gathering data to support other activities (e.g., sitewide RI/FS activities, other early actions).

Some data gaps do not become data needs. The necessity to fill data gaps exists only if the uncertainties associated with the data gaps are not acceptable or cannot be managed. For example, assume that the extent of soil contamination at an early action site is known well enough to select the appropriate early action, to prepare an appropriate design, and to develop an order-of-magnitude cost estimate for excavation and disposal, but not well enough to lay out a detailed excavation plan. Detailed sampling could fill such a data gap.

This page intentionally left blank.

However, by using field screening techniques or field support laboratories, data collection *during excavation* activities is likely feasible and sufficient to determine the bounds of the excavation. Thus, this data gap may be acceptable because the uncertainty it causes can be easily managed during the response action; in that instance, it does not constitute a data need.

Data needs are formally developed through the data quality objectives (DQOs) process. The data needs description should include the data required, where they will recollected, when they will be collected (period and frequency), and the decisions in which they will be used. The latest EPA guidance documents on DQOs are listed in the Module 4 sources. (See DOE's RI/FS guidance, Submodule 1.4, for additional information on the DQO process.)

Identifying potential applicable or relevant and appropriate requirements (ARARs) during scoping helps identify potential waste management requirements and related data needs. Three types of ARARs are identified: chemical-specific, location-specific, and action-specific.

Chemical-specific ARARs may dictate remediation-level requirements and assist in early establishment of potential remediation goals and data needs. Location-specific ARARs are requirements that limit or restrict activities in certain areas (e.g., restrictions on actions in wilderness areas, wetlands, and flood plains). Identification of location-specific ARARs should begin during scoping, on the basis of current site understanding, and should be modified as site understanding increases. Early identification of location-specific requirements can help in identifying and focusing allowable response actions and in appropriately conducting the actual early actions. Action-specific ARARs restrict or regulate remediation, treatment, or disposal activities. Identification **cm** begin with current site understanding because the likely remediation approach is known in an early action. Action-specific ARARs need to be evaluated to determine if they restrict or regulate the scope of the action. See Submodule 4.1, Note B for an example list of ARARs .

Early action objectives were initially identified and agreed to by the extended project team in the consensus memorandum (see Submodule 1,2, Development of a Consensus Memorandum). The initial objectives may need to be revised on the basis of additional site problem understanding found through review of available data, development and evaluation of the conceptual site model, and ARARs. Any change in the objectives may imply new data needs. See Submodule 4.1, Note C for example early action objectives.

Initial definition of remedial alternatives usually results in identification of data needs. The alternative(s) must be fully defined in the Engineering Evaluation/Cost Analysis (EE/CA) or Focused Feasibility Study (FFS) and later designed in detail. Both processes require information about the site, about the wastes that will be generated, treated, or disposed of, and about numerous other potential questions.

During scoping, the alternatives must only be defined sufficiently to facilitate identification of data needs. Typically in a work plan for a comprehensive RI/FS, the alternatives are little more than identified by general response actions and perhaps some indication of the technologies that might be used. Alternative(s) definition can be carried further during scoping for an early action than would be typical in a work plan for a comprehensive

Submodule 4.1 Scoping (continued)

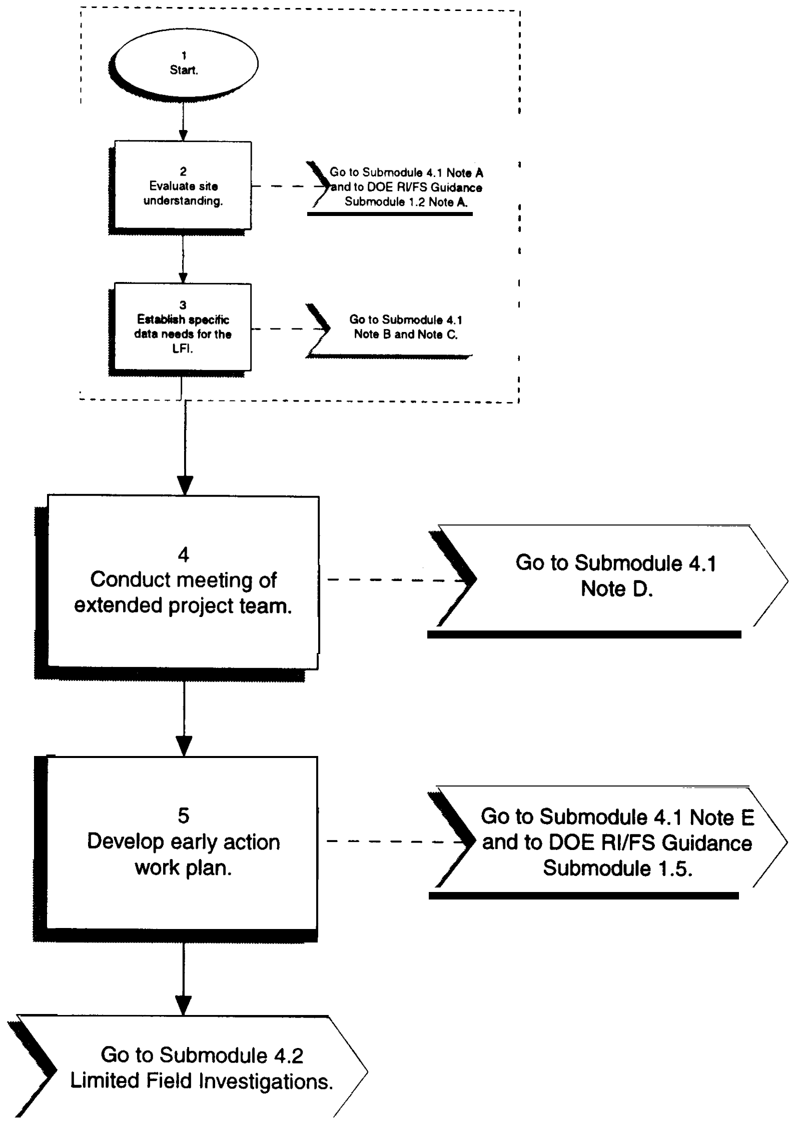
Submodule 4.1 Scoping (cont.)

NOTE:
The conceptual site model is the current understanding of how the site works.

NOTE:
Basic principles of DQO:

1. Data are collected to support specific decisions.
2. Data needs are identified by the data users for the data collectors.
3. No data should be collected unless (a) a specific decision can be identified requiring additional information, (b) the resulting action can be identified, (c) the amount and the type of data required to support the decision can be specified, and (d) the method of evaluation can be specified.
   See Superfund's DQO guidance (EPA 1993) for more detail.

NOTE:
ARARs identification is restricted only to those that relate to the early action being taken. Neither the ARARs analysis process nor specific ARARs should be allowed to impede development and implementation of an early action if the ARARs can be addressed later (i.e., in the final action).



RI/FS, because the likely (Overall approach and major features of the early action were agreed to in the consensus memormdum. The features of the alternative(s) can be worked out beyond the level of mere general response actions to indicate in outline how the alternative might actually be implemented. This streamlines both the decision and design processes in the following ways: (1) data gaps that must be filled by an LFI become more apparent; (2) the alternative(s) definition effort is carried further in the parallel effort to develop the preconceptual design (see Submodule 4.3, Preconceptual Design) that is used directly as one chapter of the EE/CA or FFS; and (3) work toward the conceptual design (see Submodule 4.5, Conceptual Design) is thus begun during scoping.

Step 4. **Conduct meeting of extended project team.** A meeting of the extended project team is essential during scoping to ensure a common understanding of the site problem(s) and proposed remedial approach, Two key agenda items are discussion of technical issues and identification of regulatory agency issues and concerns, including ARARs and potential waivers. Submodule 4.1, Note D provides a list of potential early action issues.

The agenda should be developed to encourage discussion of the conceptual site model and how the LFI, if any, will be used to reduce critical uncertainties in the conceptual site model. The meeting should include a technical presentation of the current site understanding, the initial strategy for addressing key data gaps, a list of uncertainties that have been identified as manageable, and a proposed approach for managing the uncertainty. DOE and DOE contractor technical project staff should make the technical presentation.

Step 5. **Develop early action work plan.** A work plan should be developed that details activities and decision points for the ealy action process through the decision phase and preparation of the Action Memormdum or ROD. The majority of the activities will occur in the decision and design support phase. The length and formality of the work plan will vary greatly, depending on the scope of the action. For small actions, the consensus memormdum, with some addendums, can seine as the work plan. For large-scale actions, especially those costing several million dollars, a more formal plan is essential; any project of such magnitude requires careful planning.

Still, the work plan should not mimic the full development of understandings and concerns typical in a work plan for a comprehensive RI/FS. A work plan for an early action that will not require an LFI may typically be 50 pages or less, including appendices. (The planning required for an LFI would substantially increase this number.)

If an LFI is needed, the work plan contains all of the detailed planning for the field efforts, for data management, validation, and evaluation, and for development of the LFI report. The LFI issues may constitute the majority of the work plan.

An example outline for a removal action work plan that can be used as an early action work plan is provided in Module 3, Note D. An example LFI work plan outline is provided in Submodule 4.1, Note E. Additiond detail on development of work plans is provided in DOE's RX/FS guidance, Submodule 1.5.

This page intentionally left blank.

Note A. **Example Outline for a Site Problem Understanding Writeup. The** documentation of the site problem understanding forms a section of the early action work plan. The focus of the understanding should be limited to facts, assumptions, and frank discussion of uncertainties that are relevant to the early action. This understanding should not address OU or sitewide issues unless they directly impact the early action. For example, Section 1.3, Known and Potential Contamination, should only include discussion of the known and potential contamination as appropriate to the specific site problem(s) being addressed by the early action. Specific media that are not relevant to the site problem(s) should be noted as such.

1.0 Site Problem Background

1.1 Operable Unit Site Description

1.1.1 Facility identification
1.1.2 Location
1.1.3 History of operations
1.1.4 Waste-generating processes
1.1.5 Waste facility characteristics
1.1.6 Other engineered structures
1.1.7 Interactions with other site problems

1.2 Physical Setting (as appropriate)

1.2.1 Topography
1.2.2 Geology
1.2.3 Geohydrology
1.2.4 Surface water hydrology
1.2.5 Meteorology
1.2.6 Environmental resources

1.3 Known and Potential Contamination (as appropriate)

1.3.1 Sources
1.3.2 Soil
1.3.3 Groundwater
1.3.4 Surface water and river sediment
1.3.5 Air
1.3.6 Biota
1.3.7 Conceptual site model

This page intentionally
left blank.

Note B. **Example ARARs**

It is only necessary to identify ARARs that relate to the actions being considered. Early actions are not final actions, and the Record of Decision (ROD) will not be a final ROD. Therefore, many ARARs may not apply or may be formally waived pending development of the final remedy and ROD.

Specific ARARs should not be allowed to impede developing and implementing an early action if the ARARs in question can be addressed later. Use of the “interim action waiver” [Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(a)] is encouraged and necessary if early actions are to be used to maximum value at DOE sites and if a phased response is to succeed in moving site problems into active remediation. ARARs need to be evaluated only to identify critical standards that dictate how an action must be performed.

CERCLA Compliance With Other Laws Manual (Parts 1 and **2)** (EPA, 1988; 1989) and *Risk Assessment Guidance for Supefund: Volume 1 –Human Health Evaluation (Part B: Development of Risk-Based Preliminary Remediation Goals)* (EPA, 1991) are helpful in developing preliminary ARARs. *Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA* (EPA, 1993b) addresses the timing of various aspects of identifying ARARs and documenting the reasons for waivers.

Following is a list of example ARARs for early action.

Chemical-Specific ARARs

- State regulations for soil cleanup
- Nuclear Regulatory Commission (NRC) standards for soil protection
- State radiation protection standards
- State radiation emission standards
- Clean Water Act (CWA) discharge regulations
- Toxic Substances Control Act (TSCA) requirements for polychlorinated biphenyl (PCB) spill cleanup
- EPA radiation protection standards for managing and disposing of spent nuclear fuel; high-level and transuranic (TRU) radioactive wastes
- National and state air emission limits

Location-Specific ARARs

- Resource Conservation and Recovery Act (RCRA) treatment, storage, and disposal (TSD) siting requirements
- Executive Order 11990 on wetlands (if wetlands are part of action or are affected by action)
- Executive Orders 11988 and 11990; actions within a floodplain (if floodplains are part of action or are affected by action)
- CWA Section 404 wetlands protection (if wetlands are part of action or are affected by action)
- Protection of areas that are part of the National Wildlife Refuge system
- National Historic Preservation Act (if historically designated resources are part of early action)

Action-Specific ARARs

Any of the chemical-specific ARARs can control the design and implementation of remedial actions. In addition, note the following.

- RCRA TSD facility requirements
- RCRA land disposal restrictions (LDRs)
- U.S. Army Corps of Engineers (USACE) dredging and filling permits (if wetlands are affected)
- National Pollutant Discharge Elimination System (NPDES)
- Endangered Species Act (ESA)

Note C. **Example Earlv Action Objectives.** Objectives for early actions are focused on specific actions that will be taken (e.g., remove drums, stabilize berms, control access).

Risk reduction is generally inherent in the action to be taken; quantitative risk reduction goals are left to the final ROD, except where the early action will completely address a site problem. Quantitative goals may be part of early action objectives if they can easily be determined from regulatory standards.

Early action objectives should be as specific as possible while recognizing site uncertainties. Vague objectives can lead to unclear ending points and to later disagreements about the appropriate scope for the early action.

Examples of specific early action objectives are:

- Remove the radioactively contaminated soil from the drainage channel in which it was placed and store it (for a period of up to 10 years) in a secure manner awaiting selection of a final treatment/disposal alternative in the final ROD.

- Excavate the shallow drum disposal site; remove any drums containing wastes or waste residues; remove all soil contaminated with greater than 50 parts per million (ppm) total organic halogen (TOX); and stabilize the trench in a manner that minimizes infiltration and further spread of contaminants until the final remediation.

- Design and install a pump-and-treat system capable of halting the further spread of the uranium plume in the shallow aquifer. The plume will be contained for up to 5 years to allow further investigation and development of remedial alternatives for the sources of the plume. Extraction and treatment of the groundwater will be accomplished at the lowest operating costs by a technology that will reliably yield water below Maximum Contaminant Levels (MCLS) for all contaminants.

- Stabilize the contaminated surface soils against wind and water erosion and isolate the soil from potential intruder exposure pending development of final remedial options. Stabilization will be accomplished by technology that will provide reliable effectiveness while minimizing later treatment and disposal costs during final remediation.

- Remove all hot spots above agreed-to action levels in the area of the lay-down yard and dispose of in the low-level waste (LLW) disposal facility. Regrade and reseed the disturbed areas to reestablish native vegetation.

This page intentionally left blank.

<u>Note D</u>. **<u>Example Early Action Work Plan Issues</u>.** If a work plan is developed, the following issues (some of which were first addressed in the consensus memorandum) should be considered for inclusion:

- Purpose and scope of the early action
- Objectives of the early action
- Remediation alternative(s) considered for the early action
- Preliminary consensus on management of remediation-derived wastes
- Potential ARARs and the preliminary conclusions of the extended project team about achieving or waiving each potential ARAR
- Qualitative risk information that supports decision to take action
- OU background and setting, including probable conditions and uncertainties
- Rationale, including results of using the DQO process
- Approach
- LFI tasks (including data evaluation and report)
- Management of IDWS
- FFS or EE/CA tasks and scope (e.g., focus only on selected alternatives)
- Preconceptual design tasks (see Submodule 4.3)
- Decision and documentation tasks
- Schedule
- Project management
- Appendices [e.g., Sampling and Analysis Plan *(SAP), Quality* Assurance Project Plan (QAPP), Investigation-Derived Waste (IDW) Plan, Community Relations Plan *(CRP)]*

This page intentionally left blank.

Note E.

Example LFI Work Plan Outline. The work plan for an LFI is a focused document, which ensures that the collected information fills the identified data gaps. Data collected during an LFI have a critical role in supporting the early action; these data must be collected correctly and with appropriate quality assurance/quality control (QA/QC) for the intended users. Although an LFI work plan is much shorter than an RI work plan, certain elements still must be carefully defined.

The outline below is a suggested format for an LFI work plan. Because of the limited focus of the LFI, work plan sections that discuss risk assessments, remdial action objectives, operable unit site descriptions, physical setting, and RI/FS tasks are purposely omitted.

1.0 Introduction
- 1.1 Purpose and scope of the LFI
- 1.2 Goals of the LFI

2.0 Statement of problem
- 2.1 Description of problem/contamination
- 2.2 Description of contaminated media within the scope of the LFI

3.0 Initial evaluations (to determine if those areas generate critical data needs)
- 3.1 Potential ARARs
  - 3.1.1 Chemical-specific requirements
  - 3.1.2 Location-specific requirements
  - 3.1.3 Action-specific requirements
  - 3.1.4 To-be-considered requirements
- 3.2 Applicable technologies
  - 3.2.1 Likely early action
  - 3.2.2 Alternative early actions

4.0 Rationale and approach
- 4.1 Rationale for data collection approach
  - 4.1.1 Contamination conditions
  - 4.1.2 Data gaps
  - 4.1.3 Sampling needed to fill data gaps
  - 4.1.4 Technology needed to sample the data gaps
- 4.2 Specific approach to fill data gaps
  - 4.2.1 Use of available data
  - 4.2.2 Data collection for specific purposes
  - 4.2.3 Data needs and objectives
  - 4.2.4 Projected volumes of waste
  - 4.2.5 Contaminants
  - 4.2.6 Investigation methodologies
  - 4.2.7 Data evaluation methodologies
  - 4.2.8 Treatability study
  - 4.2.9 Minimizing waste generation

5.0 Community Relations

6.0 QA/QC Plan

7.0 Schedule

8.0 Project Management

9.0 References

Note E: Example LFI Work Plan Outline (continued)

This page intentionally left blank.

Submodule 4.2 Limited Field Investigations

Non-Time-Critical Removal Actions and Early Remedial Actions

- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- 4.4 EE/CA or FFS
- 4.5 Conceptual Design
- 4.6 Remedy Selection and Documentation

4.6.1 Non-Time-Critical Removal Actions

- Fieldwork Mobilization
- Data Management and Validation
- Data Evaluation
- LFI Report

Submodule 4.2 Limited Field Investigations

Background

New data may not be required to sustain the design and decision support phase of early actions. However, a very focused data collection effort may be appropriate if new data are required to resolve data needs identified during scoping. In this document, a short-term, focused data collection and analysis effort used to support early actions is called a limited field investigation (LFI).

The data collected and analyzed through an LFI are used to refine the conceptual site model. As the conceptual site model is updated with the new information, the data gaps, significant uncertainties, and site understanding will change and directly influence the objectives or course of the early action.

For efficient implementation, LFIs require planning similar in format to the fieldwork planning in an RI/FS work plan, but with less detail. The majority of the planning is incorporated into the work plan (see Submodule 4.1, Step 5). However, additional considerations must be addressed separately as part of fieldwork mobilization.

Federal Facilities Agreements (FFAs) may have specific implementation requirements for field investigations and should be consulted.

Organization

Submodule 4.2 discusses the following:

- Fieldwork mobilization
- Data management and validation
- Data evaluation
- LFI report

In addition, more detailed information is provided in the following notes:

- Note A –Typical LFI Data Needs
- Note B – Suggested LFI Report Format

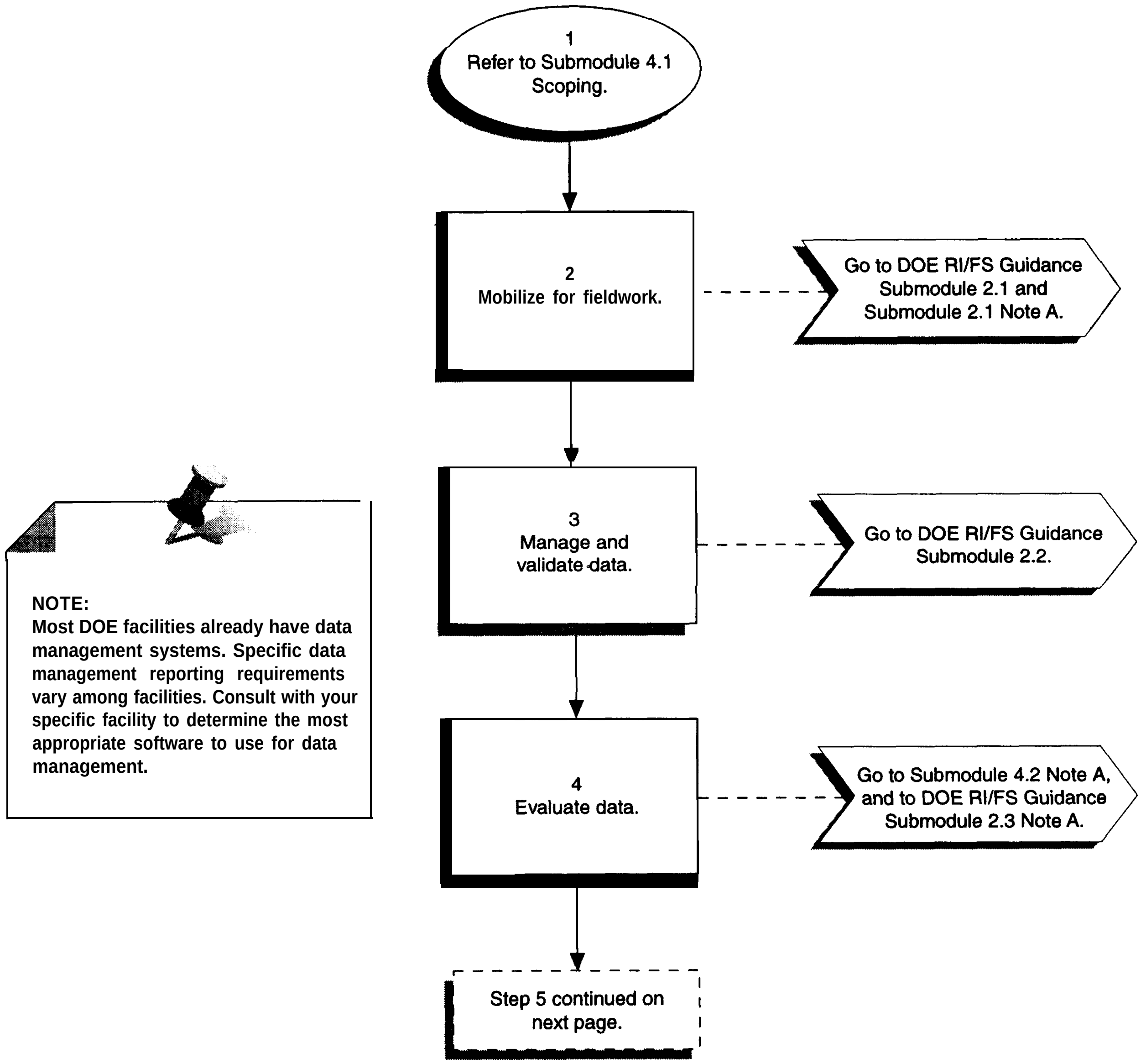
Sources

1. U.S. EPA, April 1992, *Guide to Management of Investigation-Derived Wastes,* OSWER Directive 9345.3-03FS.

2. DOE, September 1994, *CERCLA Removal Actions, DOE/EH-0435.*

3. *40* CFR *300,* March 8, 1990, *National Oil and Hazardous Substances Pollution Contingent Plan,* Federal Register, Vol. 55, No. 46 Rules and Regulations.

Submodule 4.2 Limited Field Investigations



Step 1. Refer to Submodule 4.1, Scoping.

Step 2. **Mobilize for fieldwork.** In addition to the standard mobilization issues that pertain to any fieldwork (e.g., utilities, facilities, equipment and supplies, vehicles, health and safety), there are several mobilization issues that are specific to investigation field efforts or that are particularly difficult at some DOE sites and that the DOE Project Manager must ensure are resolved prior to or during mobilization. Mobilization issues specific to investigation field efforts are:

- Procuring laboratory services (possibly including a field screening laboratory)
- Arrangements for decontamination of vehicles and equipment
- Management of investigation-derived wastes
- Sample management
- Managing analytical results and field information

The following mobilization issues can be particularly difficult for DOE facilities:

- Procurement
- Organization and management of the fieldwork
- Personnel training
- Quality assurance oversight
- Site access and security
- Permits (including excavation permits)
- Communications during fieldwork

Information on all of these mobilization issues is provided in DOE's RI/FS guidance, Submodule 2.1 and Submodule 2.1, Note A.

Step 3. **Manage and validate data.** Refer to DOE's RI/FS guidance, Submodule 2.2 for information and references on data management, validation, and usability review.

Step 4. **Evaluate data.** Data evaluation is more focused for an early action. Emphasis is placed on the physical nature and extent of the waste units and other media or site problems to be remediated. Data evaluation activities include the following:

- Examining the data

- Developing brief summaries of the data using text, maps, conceptual drawings, graphs, or tables. This work results in essential materials that can be used directly in the LFI report.

- Reviewing the summaries of the data to identify inconsistencies and/or unexpected results (e.g., outliers)

The evaluation focuses on three areas:

- **Site physical characteristics.** Types of physical data commonly collected and LFIs are listed in DOE's RI/FS guidmce, Submodule 2.3,

This page intentionally
left blank.

Note A. Physical characteristics of a site generally include topography, geology, hydrogeology, surface water features, groundwater and surface water interactions, and meteorology.

The results of evaluating physical characteristics are used to confirm and/or revise relevant elements (e.g,, soil types, aquifer boundaries, and physical characteristics) of the conceptual site model developed during scoping. Physical characteristics are important to understanding contaminant extent and potential for migration, waste unit features, probable response of an aquifer to various pumping schemes, and other similar issues.

Note the necessity to review the DQOs established for the physical data elements and the decisions that the data were to support. Data collected during the LFI frequently render some of the decisions and therefore the DQOs obsolete or invalid. Following is an example of the type of situation that may be encountered:

The conceptual site model included drawings of the assumed location and rectangular configuration of a drum disposal area. A ground-penetrating radar investigation showed that the location of the area was correct, but that its longitudinal axis was actually oriented perpendicular to that indicated by site records.

- **Evaluate nature and extent of contamination.** In many instances, the majority of the data collected during an LFI addresses nature and extent of contamination. For an early action, nature and extent of contamination should be evaluated and documented only to the extent necessary to facilitate the early action decision or design. Presentations of the data and the results of the evaluation will appear in the LFI report. This should be sufficient to enable the stakeholders to understand the nature of the early action to be undertaken and its likely effectiveness. The data and the evaluation results should also support development of the design criteria (see Submodule 4.5, Conceptual Design).

  Data for nature and extent of contamination have three major uses:

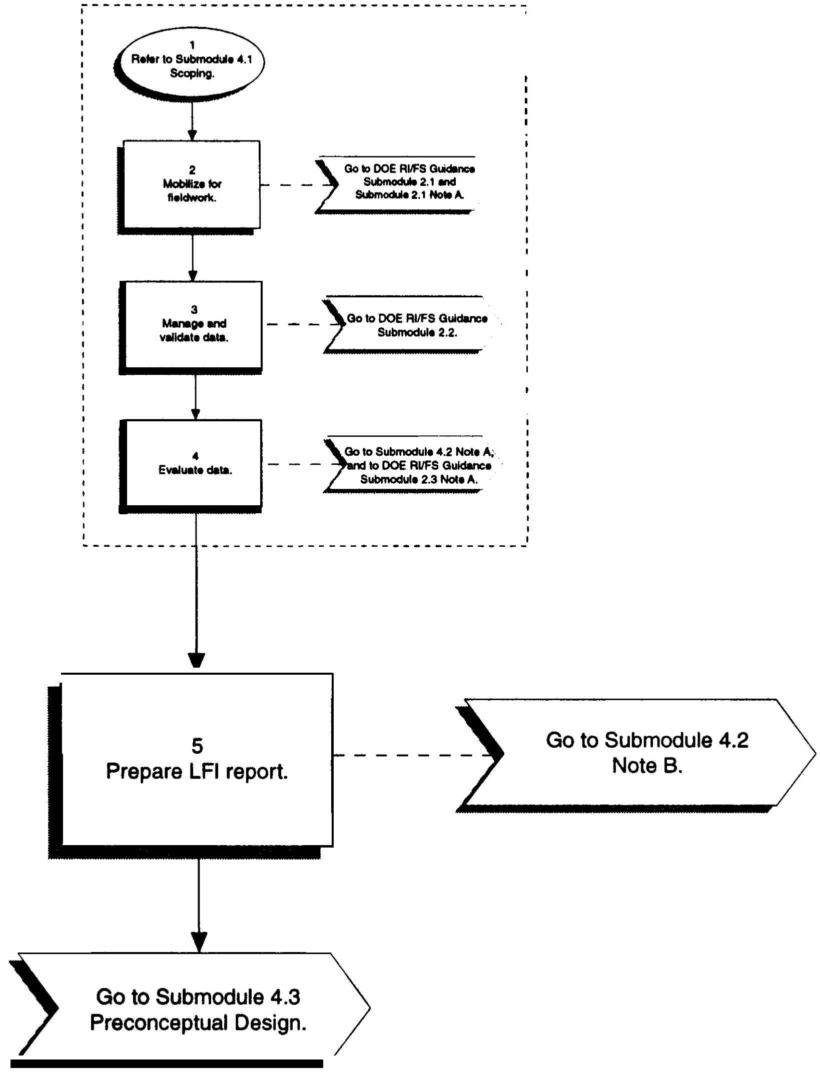
  To support the qualitative risk assessment (e.g., contaminant concentrations, spatial distributions and variability, and pathways) initially documented in the consensus memorandum

  To support ARARs evaluations (e.g., RCRA status of remediation-generated wastes)

  To support technology evaluations and designs (e.g., contamination levels, volumes of wastes, and/or contaminated soils)

  Examples of typical information needed to support these three purposes are presented in Submodule 4.2, Note A.

Submodule 4.2 Limited Field Investigations (cont.)



- **Data Quality Objectives.** Determinations must be made regarding the DQOs established for the LFI data:

  Whether the DQOs, as originally formulated, remain valid for the site problems and the early action, as they are now understood

  Whether the DQOS have been met or whether significant data needs (original or newly identified) remain

  Agreement should be reached within the extended project team about whether the data needs have been met and whether the quality of the data will support the early action decision and design.

Step 5. **Prepare LFI report.** A draft LFI report is produced for review by the extended project team. Some of the sections will be prepared as technical memoranda during the data evaluation. Submodule 4.2, Note B presents an example outline for an LFI report to support an early action. (Some DOE facilities have standardized primary document outlines.)

The final LFI report should be made available to the extended project team and other stakeholders, should be included in the Administrative Record, and should be addressed at a public meeting if interest is expressed. Writing the LFI report should be relatively straightforward. Site compliance agreements and DOE policy statements may speciy who must review an LFI report.

This page intentionally
left blank.

Note A. **Typical LFI Data Needs.** Typical early actions involve removal of source materials, temporary storage of waste in safer conditions than originally found in the environment, control of contaminant flow, or prevention of exposure to contaminants. Decisions identified during early action scoping may result in identification of data needs. For example, to support remedy selection, data needs may be divided into three main types: (1) data about physical characteristics; (2) data about nature and extent of contamination; and (3) other data needs, including information to satisfy regulatory and stakeholder concerns.

The following matrix identifies the most common types of early actions, the primary decisions associated with each, and the corresponding data needs and methods available to fill the needs. The methods focus on instrumentation that can provide real-time results to expedite implementation. Decisions and data needs related to regulatory stakeholder or health and safety concerns, which are very site-specific, are not shown in the matrix. These other decisions and data needs generally include the following:

- Decision: Whether the waste is a RCRA hazardous or mixed waste.

  Data Need: Chemical composition, history of generation of the waste, and the regulatory status of the waste.

- Decision: Whether exposures or risks exist that require special health and safety procedures during implementation.

  Data Need: Potential hazards to workers.

- Decision: Whether waste management permits or procedures require other information.

  Data Need: Waste characterization and identification.

Common Types of Action	Typical Decision	Site Physical Characteristic Data Needs	Suggested Methods to Fill Site Physical Characteristic Data Needs	Data to Characterize Nature and Extent of Contamination	Suggested Methods to Fill Nature and Extent of Contamination Data Needs
Buried container removal	The area needing removal.	Soil physical characteristics, such as moisture content and potential contamination interaction.	Soil surveys.	Container contents and surrounding soils (if a leak is suspected) should be chemically analyzed.	Field and laboratory analysis including pH, PID, FID, corrosion, and radiation should be considered.
	Optimal removal process.	Access limitations to the containers.	Map interpretation, field measurements, and documentation research for evaluating depth of burial, existing caps, or physical barriers.	The potential for release must be considered, on the basis of information that can assess leaks, container integrity, or extent of corrosion.	Determining container integrity through sampling and observation.
	Excavation, safety, and regulatory issues in certain physical environments.	Slope stability.	Field measurements for evaluating the slope stability.	The runoff potential, depth to water table, and distance to surface water bodies must be analyzed for estimating the extent of the potential contamination at levels of concern for early action.	USGS topographic maps, well logs, and local hydrology reports are sources of information that would provide these data.
	Safe excavation and removal and storage needs.	Container type, number, and condition.	Geophysical surveys for locating the buried items and estimating the number of buried containers.		

Common Types of Action	Typical Decision	Site Physical Characteristic Data Needs	Suggested Methods to Fill Site Physical Characteristic Data Needs	Data to Characterize Nature and Extent of Contamination	Suggested Methods to Fill Nature and Extent of Contamination Data Needs
Soil source ("hot spot") removal in surface or near-subsurface areas	Whether interaction between the source and other media has occurred.	Soil physical characteristics, such as water content and permeability.	Soil surveys.	Chemical nature of release for assessing the contamination levels.	Historical data, field, and laboratory analysis.
	Optimal removal process.	Access to the area.	Map interpretation, field measurements, and documentation research for evaluating depth of burial, existing caps, or barriers.	Extent of subsurface and surface migration for calculating volumes of materials to be excavated.	Field methods such as XRF, soil-gas, and radiation surveys may help define the contaminant plume, depending on contaminants.
	Area to remove.	Identifying the Source location.	Historical documents, aerial photography, USGS maps, and well-defined sampling plans are potential sources.	The potential for migration to other media such as runoff potential, depth to water table, and distance to surface water bodies.	USGS topographic maps, well logs, and local hydrology reports are sources of information that would provide these data.

Common Types of Action	Typical Decision	Site Physical Characteristic Data Needs	Suggested Methods to Fill Site Physical Characteristic Data Needs	Data to Characterize Nature and Extent of Contamination	Suggested Methods to Fill Nature and Extent of Contamination Data Needs
Surface runoff containment	Identifying an area where all of the drainage can be easily accumulated and treated. Designing the treatment area for preventing flooding and levying breakage.	The surface topography and drainage pattern. The climate and precipitation patterns.	USGS topographic maps and surveys for assessing where the drainage will accumulate. NOAA/NWS weather data and local newspapers for evaluating 100-year flood levels.	Chemical nature of release for assessing the contamination levels. Extent of subsurface and surface migration for calculating the volumes of materials to be excavated. The potential for migration to other media such as runoff potential, depth to water table, and distance to surface water bodies.	Historical data, field, and laboratory analysis. Field methods such as XRF, soil-gas, and radiation surveys for defining the contaminant plume, depending on the contaminants. USGS topographic maps, well logs, and local hydrology reports are sources of information that would provide these data.

Common Types of Action	Typical Decision	Site Physical Characteristic Data Needs	Suggested Methods to Fill Site Physical Characteristic Data Needs	Data to Characterize Nature and Extent of Contamination	Suggested Methods to Fill Nature and Extent of Contamination Data Needs
Groundwater plume containment	Plume contamination extent and mobility.	Hydraulic properties of the aquifer such as flow rates.	Aquifer pumping tests for assessing flow rates.	Chemical nature of release for evaluating contamination levels.	Historical data, field, and laboratory analysis.
	Direction of plume movement from the source.	Aquifer flow direction.	Monitoring well data for assessing flow rates.	locations of plume boundaries for assessing the volume and area of the contaminant plume.	Soil gas surveys and field analyses such as Hydropunch™ for mapping the plume for certain contaminants.
	The length of time involved for contaminants to migrate to the water table.	Vadose Zone properties.	Soil surveys.	Location of aquifer recharge/discharge areas for assessing whether any contamination is a direct source into or out of the aquifer.	USGS hydrologic maps for assessing the recharge and discharge areas of the aquifer.

Common Types of Action	Typical Decision	Site Physical Characteristic Data Needs	Suggested Methods to Fill Site Physical Characteristic Data Needs	Data to Charatierize Nature and Extent of Contamination	Suggested Methods to Pill Nature and Extent of Contamination Data Needs
Waste removal and packaging for temporary waste storage	Optimal removal process.	Access to the waste.	Map interpretation, field measurements, and documentation research for evaluating depth of burial, existing caps, or barriers.	Chemical nature of release for evaluating the contamination levels.	Historical data, field, and laboratory analysis.
	Ensuring that all unauthorized personnel remain away from the contaminated areas.	Site security.	A facility security plan is needed for implementing the necessary security measures.	Extent of subsurface and surface migration.	Field methods such as XRF, soil-gas, and radiation surveys will help define the area needing excavation, depending on the contaminants.
				The potential for migration to other media such as runoff potential, depth to water table, and distance to surface water bodies.	USGS topographic maps, well logs, and local hydrology reports are sources of information that would provide these data.
				Waste compatibility for container and staging purposes is necessary for waste that must be stored in a permitted/approved area.	Field and laboratory analysis such as pH, PID, FID, corrosion, and radiation must be completed.

Note B. **Suggested LFI Report Outline.**

1. Executive Summary
   1. Introduction
   1.1 Purpose of report
   1.2 Brief site background
      1.2.1 Site description
      1.2.2 Site history
      1.2.3 Previous investigations
   1.3 Report organization

2. Study Area Investigation
   2.1 Surface features (natural and man-made, topographic mapping, etc.)
   2.2 Contaminant source investigations
   2.3 Surface water and sediment investigations
   2.4 Geological investigations
   2.5 Soil and vadose zone investigations
   2.6 Groundwater investigations
   2.7 Radiological walkovers

   (If technical memoranda documenting field activities were prepared, they can be retained in the files and referenced in the report.)

3. Physical Characteristics of the Study Area
   3.1 Surface features
   3.2 Meteorology
   3.3 Surface water hydrology
   3.4 Geology
   3.5 Soils
   3.6 Hydrogeology

4. Nature and Extent of Contamination
   4.1 Results of data usability evaluation
   4.2 Results of site characterization (natural components and contaminants in some, but not necessarily all, of the following media)
      4.2.1 Sources (lagoons, sludges, tanks, etc.)
      4.2.2 Soils and vadose zone
      4.2.3 Groundwater
      4.2.4 Surface water and sediments
      4.2.5 Air

5. Conceptual Site Model/Risk Evaluation
   5.1 Sources
   5.2 Release mechanisms
   5.3 Pathways
   5.4 Receptors

Submodule 4.3 Preconceptual Design

Non-Time-Critical Removal Actions and Early Remedial Actions

- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- 4.4 EE/CA or FFS
- 4.5 Conceptual Design
- 4.6 Remedy Selection and Documentation

4.6.1 Non-Time-Critical Removal Actions

- Development of Preconceptual Design
- Definition of Contingency Plans
- Development of Monitoring Plans
- Preparation of Draft Action Memorandum

Background

During scoping, work begins on defining the alternatives, which is actually the earliest step of design. Because the likely overall approach and major features of the early action are fairly certain, starting work on defining the alternatives is possible during scoping and is a major opportunity for streamlining the decision and design support phase. Another advantage is that early work to explore some of the details of the action will often identify additional data needs that can be addressed through an LFI.

In this submodule, the preconceptual design of the alternative(s) is addressed. This effort is very similar to defining the alternatives in a comprehensive FS (see DOE's RI/FS guidance, Submodule 5.1); that is, the design is carried to approximately the same level of detail. This is not additional work being added to the early action process. All of the work to develop a preconceptual design of the alternative(s) will have to be completed to present the defined alternative(s) in the Engineering Evaluation/Cost Analysis (EE/CA) or Focused Feasibility Study (FFS). The work is simply moved forward in the process to the earliest point possible, to take advantage of the additional understanding that comes from the focused early action and to capitalize on the time savings (streamlining) inherent in doing each step of the process as early as reasonable.

The overall approach for the early action and many of the ancillary issues (e.g., ARARs, waste management, manageable uncertainties) were worked out at a preliminary level and were brought to consensus in the consensus memorandum. In preconceptual design, the early action evolves from a concept or vague idea to a fairly specific approach to remediation. Most of the smaller details will remain undecided, and any aspect of the approach is subject to change during the final design after the ROD or Action Memorandum is final. But all of the important features of the early action should be specified, and (in general) the action(s) should be presented such that any reader can clearly understand what is envisioned for the remediation.

The primary purposes in starting the preconceptual design during the scoping stage are:

- The essential implementability of the envisioned early action is confirmed through working out the major features of the action.

- Data needs are identified for the EE/CA or FFS and for the design.

- The preconceptual design of the alternative is the detailed formulation used to communicate the substance of the early action in its most concrete terms. It is useful for increasing understanding, within the extended project team, of the details and difficulties of the early action.

- The preconceptual design of the alternative(s) is the basis for the detailed evaluation in the EE/CA or FFS. It is incorporated directly as a chapter of the document.

Although preconceptual design of the alternative(s)at this point is similar to defining the alternatives in a comprehensive FS (this is the best model for what a preconceptual design should be), some differences do exist: (1) the preconceptual design may address issues, such as contracting strategy, that are not typically addressed in an FS; (2) the preconceptual design can be developed further than an alternative would generally be developed in an FS, because typically only one alternative is under consideration and the further work is less likely to be wasted effort; and (3) the preconceptual design of an early action is not an *example* of how the alternative might work in practice, but is the conceptual approach that will *be implemented* (allowing for some changes as the concept is refined, stakeholder imput is received, and the final decision is made).

In an EE/CA the alternative(s) will be analyzed in detail against three criteria:

Effectiveness
Implementability
cost

In an FS the alternative(s) will be analyzed against seven technical criteria:

Overall protectiveness of human health and the environment
Compliance with ARARs
Long-term effectiveness and permanence
Reduction of toxicity, mobility, and/or volume of wastes or contaminants through treatment
Short-term effectiveness
Implementability
cost

The preconceptual design of the alternatives must be detailed enough to support the detailed analysis of the alternative(s) against each of the relevant criteria, but may be carried further if appropriate. Assessing how far to carry the design effort at this point is primarily a matter of judgment. Two possibilities are:

- In most instances only one alternative, perhaps with minor variations, is considered after the consensus memorandum is developed. In this instance, the break between preconceptual design and conceptual design (See Submodule 4.5, Conceptual Design) is somewhat artificial, and the design can proceed directly into conceptual design. Other than pausing long enough to write up the description of the alternative that will be used in the EE/CA or FFS, the design effort may be able to proceed without pause.

- In some instances, it may have been possible in the consensus memorandum only to decide that an action will be pursued (because of the nature of the release or threat of a release), but not to determine the likely best course of action. In such instances, two (or in rare instances perhaps even three) alternatives may be under consideration, and it will not be profitable to carry the preconceptual design beyond the minimum required to meet the purposes of the EE/CA or FFS. After the detailed evaluation is completed for the EE/CA or FFS, the extended project team should be able to identify the likely best alternative. At that point, the design effort can resume with the preparation of the conceptual design (see Submodule 4.5. Conceptual Design).

This page intentionally
left blank.

In this submodule, the essential minimum preconceptual design is described. Whether and how far to carry the design beyond what is specified here is a decision that must be made by the DOE project manager or designee.

Organization

Submodule 4.3 discusses the following:

- Development of preconceptual design
- Definition of contingency plans
- Development of monitoring plans

In addition, more detailed information is provided in the following note:

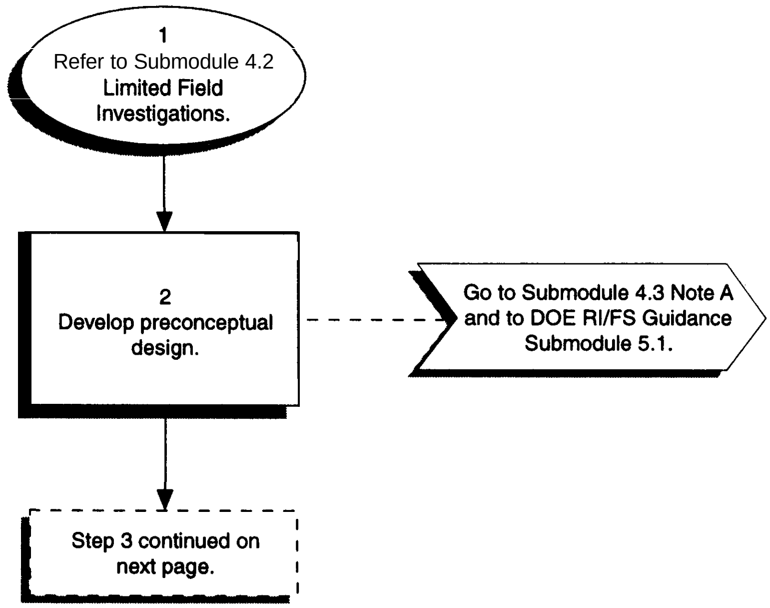
- Note A–Example Preconceptual Design

Sources

1. DOE, September 1994, *CERCLA Removal Actions, DOE/EH-0435.*

2. **40 CFR 300,** March 8, 1990, NationalOil and Hazardous Substances pollution Contingent plan, Federal Register, Vol. 55, No. 46 Rules and Regulations.

Submodule 4.3 Preconceptual Design



Step 1. Refer to Submodule 4.2, Limited Field Investigations. Also refer to Submodule 1.2, Development of a Consensus Memorandum, for an explanation of the level of detail used in describing the early action approach in the consensus memorandum. The further elaboration of that description into a preconceptual design is the subject of this submodule.

Step *2*. **Develop preconceptual design.** A complete design team will eventually be needed to develop the final design, The first members of the design team should be identified at this point and assigned responsibility to develop the preconceptual design. The composition of the team that will develop the preconceptual design is highly dependent on the remedial actions envisioned. At a minimum, the project engineer and lead design engineer should be identified. Together, these two individuals should be able to identify the types of expertise (e.g,, process engineer, construction engineer, modeler, hydrogeologist, soil chemist, engineering graphics) that will be needed to develop the preconceptual design. These personnel should be involved in all major planning meetings to provide key design data needs.

The primary purposes of preconceptual design are:

- Feasibility of the early action is confirmed. During development of the preconceptual design, the implementability, effectiveness, and cost (which constitute “feasibility” in the CERCLA context) are evaluated at an initial level of detail. Once the preconceptual design is completed, the essential feasibility of the envisioned approach should not be in question. If it is, either the problem is not a good candidate for early action, or the approach chosen for development is not a good alternative.

- Understanding of the envisioned action increases. The preconceptual design is the detailed formulation used to communicate the early action approach in its most concrete terms. As such, it is useful in increasing understanding of the details and difficulties of the early action within the extended project team and between technical staff (e.g., members of the design team).

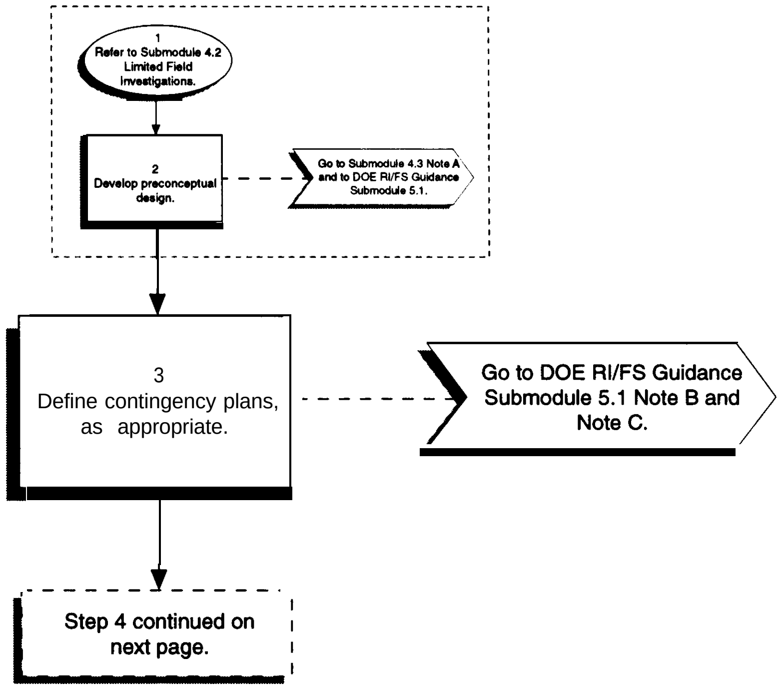
- The preconceptual design serves as the basis for the detailed evaluation required in the EE/CA or FFS.

The preconceptual design must be specific enough to support evaluations against all of the applicable criteria (see the Background section of this submodule). To evaluate an alternative(s) against the criteria, details will be required about how the alternative(s) will be accomplished. For example, in order to assess whether a precipitation process can be designed to treat metals in contaminated water at certain levels (and to certain levels), completion of a preconceptual design of a feasible system will usually be necessary for exploring different process options and combinations of process options. In this process, the alternative becomes specific enough to make predictions about protectiveness, achieving ARARs, effectiveness, implementability, and cost.

Note that no matter how specific the preconceptual design of an alternative may become, any aspect of it may be modified through later stages of the design process. The preconceptual design does not determine, in a final sense, any aspect of the remediation.

Submodule 4.3 Preconceptual Design (continued)

Submodule 4.3 Preconceptual Design (cont.)



Only the Action Memorandum or the ROD determines the major features of the early action; the final design determines the details.

Because early steps of the design are being moved to an earlier stage in the process, developing the early action alternative(s) to a preconceptual design level requires more engineering time and resources than is usual in the scoping stage. Adequate funding must therefore be allowed for this step. Submodule 5.1 of DOE's RI/FS guidance provides examples that further explain the complexity and cost of defining (developing preconceptual designs of) alternatives.

The preconceptual design is developed to meet the expected site conditions, as reflected in the conceptual site model. The alternative(s) (and hence the preconceptual design) essentially assume that the expected conditions are the conditions that will be met in the field during implementation. (The possibility that different conditions will be found is addressed separately; see Step 3.) The preconceptual design of the alternative(s), as developed to meet the expected conditions, is the focus of the detailed analysis in the EE/CA or FFS. Any potential deviations from the expected conditions, the contingency plans to meet those deviations, and the implications (cost and other) of the contingency plans, are modifying factors that are also considered in the detailed analysis and in the decision making process for an early action.

Submodule 4.3, Note A provides an example of a "defined alternative" that is a good model for a preconceptual design of an early action. However, the example is more elaborate and detailed than would generally be necessary to support an early action.

Step 3. **Define contingency plans, as appropriate.** The two primary reasons for developing contingency plans are:

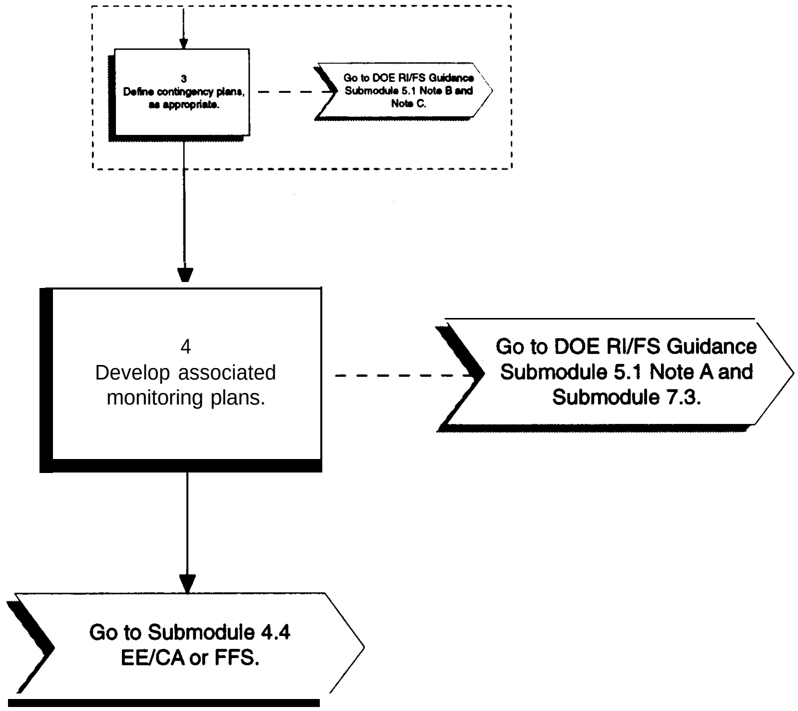
- To facilitate earlier cleanup by enabling remediation to begin even though some uncertainties remain about actual site conditions. When prepared with contingency plans for any foreseeable deviations of actual site conditions from the expected conditions, and with proper monitoring for such deviations, remediation can begin.

- To facilitate a more realistic bidding process by informing the prospective remediation contractor(s) of the potential deviations and of the responses that they will be expected to implement (i.e., contingency plans) for any deviation,

During the preconceptual design, the internal DOE project team (e.g., engineers, regulatory specialists, risk assessors) considers each of the reasonable deviations from the probable conditions and from their potential impacts on the alternative(s). The EE/CA or FFS should address every impact. Contingency plans are developed for any impacts that are significant. If no contingency plan is possible for meeting a potential deviation (i.e., it cannot be reasonably guaranteed to be a workable approach), the alternative is probably not a good approach for the early action and should be revised.

The contingency plans must be defined in sufficient detail to support the detailed evaluation in the EE/CA or FFS; but they do not have to be defined to the same level of

Submodule 4.3 Preconceptual Design (cont.)



detail as the alternatives. Contingency plans for an early action may be developed in greater detail at this stage in planning than they might be in a comprehensive FS.

The faster pace of an early action and the reduced range of alternatives being considered (usually only one) justifies a greater investment in planning for contingencies. Three considerations in defining each contingency plan are:

- Implementability – whether a modification of the alternative (i.e., a contingency plan) can be implemented and relied upon to work effectively.

- Protectiveness – whether the contingency plan will provide equal or greater protectiveness and achieve ARARs as effectively as the (base) alternative.

- Cost –the cost impacts of having to implement the contingency plan. Great accuracy in the cost estimate for the contingency plan is not the goal. The likelihood of the deviation presumably is low (otherwise, the deviation would be the expected condition) and the alternative probably will be implemented as in the design. But, the approximate cost impact must be known for consideration in the detailed evaluation.

Examples of contingency plans are provided in DOE's RI/FS guidance, Submodule 5.1, Notes B and C, and in Submodule 4.3, Note A of this guidance.

Step 4. **Develop associated monitoring plans.** The purposes of the monitoring plans are (1) to evaluate whether actual site conditions match expected site conditions and (2) to evaluate technology performance. Primary indicators of conditions and performance are selected for observation. Expected values for these parameters are established for the expected conditions and expected technology performance, as well as for the potential deviations. These expected values are then used to determine when a deviation has been encountered or when a technology has failed.

A monitoring plan should be developed for each potential deviation that could affect implementation of the alternative(s). The monitoring plans are one of the most important aspects of the alternative(s) and should be defined to the same level as the alternative(s). This is necessary for two reasons: (1) the monitoring plans will *be* implemented (unlike a contingency plan, which only *may* be implemented) and relied upon for the selected alternative; and (2) the cost impacts of the monitoring plans must be known so that they can be included in the order-of-magnitude cost estimate for the alternative.

DOE's RI/FS guidance, Submodule 5.1, Note A includes an example monitoring plan; Submodule 7.3 of that guidance provides additional information on monitoring plans. Submodule 4.3, Note A of this guidance provides an example of a monitoring plan in a preconceptual design.

This page intentionally left blank.

Note A.

Example Preconceptual Design. This example preconceptual design is for an early action at the Weldon Spring Site. It is an example of the level of detail at which an action should be worked out during preconceptual design. The level of detail is similar to the level of detail appropriate for a "defined" alternative in a CERCLA FS (see DOE's RI/FS guidance, Submodule 5.1). But, it is important to point out that the level of detail in this example is more likely to be appropriate to an interim remedial action than to a non-time-critical removal or an early remedial action. Interim remedial actions can be used for site problems of any level of complexity and for actions costing millions of dollars; careful definition of the alternative is appropriate for an action that substantial.

The following details should be noted from this example.

- The level of definition is much greater than required simply to communicate the essentials of the alternative to the extended project team and stakeholders. In addition to communicating essential features, the level of definition has to be sufficient: (1) to allow regulatory specialists and regulatory agency personnel to determine the likelihood of achieving any ARARs that will not be waived for implementation of the early action; and (2) to allow risk assessors to determine the likelihood of achieving human health and environmental protectiveness through implementation of the early action.

- The alternative has to be resolved in sufficient detail such that an engineer can predict with reasonable assurance the implementability, effectiveness, and reliability of the alternative, if implemented as envisioned and if the expected conditions are actually met in the field.

- The alternative has to include identification of uncertainties, potential deviations, contingency plans, and monitoring plans.

- The level of definition has to be sufficient to allow a cost engineer to identify all major cost elements in the following categories:

  design
  permitting
  procurement
  bonding
  insurance
  legal services
  rent (office and work space)
  labor
  materials
  travel
  equipment (purchase and rental)
  special equipment that will have to be fabricated (e.g., treatment systems)

specialty subcontractors
mobilization
utilities
site access
relocation of affected population
land acquisition and site development
utility relocation
buildings
site security
health and safety
services during construction
sampling and analysis (e.g., compliance, health and safety, investigation during remediation, fugitive emissions monitoring and control)
monitoring for deviations and effectiveness (monitoring plan)
decontamination
management of wastes
reports during remediation
community relations during remediation
management of treatment residuals
transportation
demobilization
startup
operation and maintenance
contingencies
profit (contractors)

Weldon Spring Site Remedial Action Project Quarry **Preliminary Engineering Report** **January 1990**	
1.0 Introduction	
1.1 Purpose of Report	
The purpose of this report is to provide a framework for conceptual design and to support the environmental compliance process for the removal of approximately 95,000 cubic yards (cy) (DOE, 1987) of radiologically and chemically contaminated waste from the Weldon Spring quarry to a temporary storage area at the Weldon Spring chemical plant area. The waste consists of steel drums, structural steel and concrete rubble, machinery, sludges and soil.	**Scope of the action.**
The report describes the various processes and facilities that are necessary for waste removal, transport, and storage; the criteria to be used in design; and measures necessary to ensure compliance with applicable environmental safety and health standards and guidelines.	
1.2 Background and General Description of Work	
The Weldon Spring quarry was excavated prior to 1942. The limestone mined from the quarry was used for the construction of the Weldon Spring Ordnance Works.	
Between 1942 and 1945 the quarry was used by the Army for disposal of residues generated by the Ordnance Works. After that it was used until 1957 as a disposal site for rubble that had been contaminated with trinitrotoluene (TNT) and other nitroaromatic compounds.	**Site history.**
In 1958 the U.S. Atomic Energy Commission (AEC) assumed custody of the quarry and used it as a disposal site for chemically and radioactively contaminated wastes generated by the Weldon Spring Chemical Plant, built on the site of the Ordnance Works and operated until 1969. The wastes dumped into the quarry included drummed waste, uncontained waste, building rubble, and contaminated process equipment.	
The U.S. Department of Energy (DOE) proposes to remove the contaminated wastes from the quarry to a temporary storage area within the chemical plant area as a part of the Weldon Spring Site Remedial Action Project (WSSRAP). Final disposition of the Quarry wastes will be addressed in the Weldon Spring Chemical Plant Record of Decision.	
The work covered in this report involves the excavation of the contaminated wastes from the quarry pit and their handling, transportation, segregation and storage in a temporary storage area at the chemical plant area.	**Scope of the action.**

1.3 Location of Work

The work to be performed is located at the Weldon Spring Site which is near Weldon Spring, Missouri, about 30 miles west of St. Louis (see Figure 1.1). The Weldon Spring Site consists of two non-contiguous areas, namely, (1) the chemical plant and raffinate pits area and (2) the quarry. The quarry is about 4 miles south-southwest from the chemical plant area and is accessible by State Highway 94.

1.4 Report Organization

This report is organized to provide the reader with an understanding of the design and construction sequence for accomplishing the removal of contaminated waste from the quarry. The report addresses various alternatives for accomplishing the work; selects a preferred design approach; and identifies problems, concerns or uncertainties that will be considered before the final design and construction,

Based on the above approach, the main topics of this report are presented in the following order:

- Introduction
- Bulk Waste Excavation
- Bulk Waste Hauling
- Bulk Waste Segregation and Temporary Storage
- Proposed Method of Accomplishment
- References
- Appendices

2.0 Bulk Waste Excavation

2.1 Site Description

-
-
-

2.2 Site Preparation

2.2.1 Temporary Facilities

The excavation subcontractor will set up trailers outside the restricted area for supervisory, office, and health and safety personnel. Temporary facilities to be provided by the subcontractor include personnel trailers, and portable restrooms. The subcontractor will set up the parts trailer, equipment repair trailer and fueling facilities within the restricted area.

Subcontractor-provided facilities.

It is anticipated that periodic washdown of the subcontractor's excavation equipment will be necessary. Facilities will be established to accomplish this within the excavation area. Drainage ditches will be designed to drain to the quarry pond. Smaller equipment will be washed at a decontamination pad that will be provided by the Government at the quarry staging area. 2.2.2 **Clearing and Grubbing** • • • 2.3 **Excavation** 2.3.1 **General**	
The bulk waste material has been deposited entirely within the confines of the quarry. The quarry walls are primarily Kimmswick limestone. The deepest portion of the original quarry floor was excavated about 15 feet into the underlying Decorah Formation, which consists of shale and limestone layers. Therefore, some of the quarry floor is in the Decorah Formation while the remainder of the benches are in the Kimmswick limestone. Joints within the Kimmswick are vertical with apertures varying from about one inch to several feet. Clay fillings are present in many of the joints. As the bulk excavation material is removed, initial cleanup of the walls will be limited to scraping by the excavation equipment. High pressure washing of the walls will then be utilized to remove visible loose material not removed by the equipment.	**Probable conditions.**
The floor of the quarry will be trenched to promote drainage to a dewatering facility set up at the quarry pond. It is anticipated that the drainage trenches can be excavated without blasting by using a small backhoe in the shales and limestone benches. Drainage across open fractures on the quarry floor will be controlled by providing quick-setting impervious grout bridges in the fractured areas so that the quarry drainage can be directed to the dewatering sump. All loose material on the quarry floor that can be removed using conventional equipment will be removed. There will be some manual work performed to remove loose material from cracks and crevices.	**Approach.**
The quarry walls are believed to be stable. However, a portion of the northern wall could be of marginal stability.	**Probable conditions.**
Stabilization could be accomplished with rock bolts, wire mesh and shotcrete. The high walls will be inspected during waste removal in order to verify stability. Any costs for wall stabilization will be covered as a deviation and addressed via the observational method to be described in the Conceptual Design Document (see Section 2.3 .2).	**Monitoring for reasonable deviation to probable conditions.**

The material to be removed has been briefly described under Section 2.1. The majority of the waste material will be fine-grained soils, rock and rubble. Table 2.1 shows the approximate dates of the waste disposal, the classification of the waste, and the estimated quantity where known. Figure 2.3 shows the zones of radiological contamination at the fenced quarry area. Figure 2.4 shows the sampling locations and chemical constituents detected at the quarry, and Figure 2.5 shows the area of relatively high concentrations of surficial nitroaromatic contamination. Preliminary sorting of 'wastes, including a rough washdown of metal and structural wastes, will be done at the quarry site as space and logistics permit. After transport to the temporary storage area at the chemical plant, the material will be segregated into piles according to the following categories:	**Remediation approach.**
A - Rock and concrete rubble B - Fine-grained soils C - Sludge D - Nitroaromatic-contaminated soils E - Structural debris (such as metal shapes, plates, and piping) F - Drummed waste containers G - Equipment and process vessels H - Cleared and grubbed materials.	
The nitroaromatics taken from the east end of the quarry (Figure 2.5) will be kept segregated during excavation, hauling and temporary storage.	
Rough estimates of the quantities for the various categories in the temporary storage area are included in Section 4. Table 2.2 summarizes the volume of radiologically contaminated material in zones shown on Figure 2.3. The total volume of 83,200 cy agrees favorably with an earlier estimate of 95,000 cy which included a 9,000 cy contingency (DOE 1987). Potential variations in volumes of each waste type will be factored into the temporary storage area design.	
2.3.2 **Observational Method**	
An observational design approach, as described below, will be utilized for the quarry bulk waste removal project. The observational method provides for a structured approach to managing uncertainty, whereby planning is based on available data and realistic assumptions of field conditions. Reasonably conceivable deviations to those conditions, and mechanisms by which to identify their occurrence are defined, and plans to address or mitigate adverse effects as a result of the deviations are developed. The planning and design for unfavorable conditions will be addressed in a Conceptual Design Document (CDD). The CDD will expand on the information presented in this document. The additional cost and schedule for unfavorable conditions will be carried as separate cost items in the CDD estimate.	**Approach for managing uncertainty.** **First design deliverable.**
The initial design will assume that waste will be adequately dewatered so that a single-pass excavation can be performed safely regarding the environment,	

Table 2.1
Waste Disposal at the Weldon Spring Quarry[a]

Date	Material	Quantity
1942-1945	NITROAROMATICS AND RESIDUES Quarry used for disposal of TNT/DNT wastes.	50,000 Cy Unknown
1946	NITROAROMATICS AND RESIDUES Quarry used for disposal of TNT/DNT wastes.	90 tons
1946-1957	TNT RESIDUES Residues and rubble dumped in deepest part of quarry and in northeast corner.	Unknown
1959	THORIUM RESIDUES Drums containing 3.8% thorium dumped. Currently below water level. Contains Ra-228 content of 1/4 curie.	185 cy
Early 60s	BUILDING RUBBLE, EQUIPMENT, SOILS Demolition rubble from Mallinckrodt Destrehan Street Plant. Covers approximately one acre to 30 ft deep in the deepest part of the quarry. Contains uranium and radium contamination with 1 curie Ra-226.	50,000 Cy
1963-1965	THORIUM AND URANIUM RESIDUES Several thousand drums containing thorium and rare earths from Granite City Arsenal. Initially intended for disposal. Much of waste later removed for reprocessing.	Unknown
1966	THORIUM RESIDUES Drums and residues from shutdown and cleanup of Weldon Spring Chemical Plant process equipment,	Unknown
1966	THORIUM RESIDUES Hundreds of drums brought from Cincinnati by rail. Contain 3 % thorium with estimated 1 curie Ra-228. Placed above water level.	555 cy
1966	TNT/DNT RESIDUES Contaminated stone and earth dumped in northeast corner of quarry covering the Cincinnati thorium residues.	Unknown
1968-1969	URANIUM AND THORIUM RESIDUES Contaminated building rubble and process equipment from Weldon Spring Chemical Plant. Principal sources of radioactivity are Ra-226 and Ra-228.	5,555 Cy

[a]Source: Table 4.1 of MKF & JEG, 1989a.

operating personnel, and equipment. Possible deviations to the plan that will be addressed by the observational method described in the CDD include:

Reasonable deviations.

Table 2.2
Weldon Spring Quarry Summary of Estimated Areas and Volumes of Radiological Contamination at the Weldon Spring Quarry[a]

Zone[b]	Area (Sf)	Volume (cy)
Haulway	48,300	6,600
Sump[c]	58,900	55,100
Northeast Comer	52,800	21,300
Rim	11,000	200
Total	**171,000**	**83,200**

[a]Source: MKF & JEG, 1989a.
[b]See Figure 2.3 for zones.
[c]Includes 4,100 cy of sediment in pond.

a) Additional dewatering requirements.

b) Greater concentration of radon or chemical contamination than estimated.

c) Higher level of protection required for personnel as a result of item (b).

d) Greater time required to perform the work as a result of items (a), (b), and (c).

e) Increased cost and schedule due to the inability to adequately dewater the material.

f) Stability of quarry walls.

2.3.3 **Safety and Health Protection Measures**

-
-
-

2.3.4 Radon and Radon Daughter Product Control

2.3.4.1 Radon and Radon Daughter Product Monitoring

-
-
-

2.3.4.2 **Engineering Controls** • • • **2.3.5 Equipment** Approximately 90 percent of the excavation will be located in cuts varying from 10 feet to 40 feet in depth. The material is heterogeneous and may vary in densities from 3000 to 4400 pounds per cubic yard. A backhoe capable of excavating the waste material in a single pass is desirable if the dewatering system for the quarry pond and the surrounding groundwater system is successful in lowering the water level substantially to the quarry floor. A large hydraulic backhoe excavator meets the requirements of removing the deepest fills of 40 feet by means of a 61-foot hoe reach, sufficient power and a large bucket. Figure 2.6 illustrates application of this equipment for this alternative - Alternative 1.	**Methods and means that may prove acceptable.**
Two additional dewatering wells, located as shown on Figure 2.6 and designated as wells nos. 2 and 3, will improve the effectiveness of the dewatering system to allow implementation of this alternative.	**Scope.**
If the water table is only partially lowered, then a second alternative using a two or more stage excavation program will be required. The large long-reach backhoe would not be needed, but something with less reach and less power could be employed. Lifts of approximately 20 feet maximum could be excavated by means of a hydraulic backhoe excavator equipped with a hoe capable of digging to 35 feet, as shown in Figure 2.7. As a third alternative, in the event dewatering is unsuccessful, a dragline approach as shown in Figure 2.8 would be used. The equipment would work the face in one pass to the full depth, but remain approximately 90 feet back from the toe of the face. A dragline excavator equipped with a 125-foot boom and a 5-cy bucket would meet the requirements for the task. • • • The excavated waste would be cast directly behind the excavator in each case, where more room would be available for gross sorting and loading on the haul trucks.	**Contingency plans.**
Two front-end loaders of 3 to 5 cy capacity will be used for sorting, a 5 cy front-end loader for truck loading, and a hydraulic crane of 10 to 15 ton capacity will be used for removing, stacking, and loading out structural plates and shapes. Also as shown on Figure 2.6, there would be a bulldozer working on the quarry floor for feeding waste to the backhoe. The trucks used for hauling are discussed in Section 3.	**Methods and means.**

Support equipment for the excavation equipment will include a motor grader for maintaining drainage ditches and a 3500-gallon water truck for haul roads within the quarry area. Water supply to the excavation area will also be required to provide spray water for dust control and for sluicing quarry walls. Trenches will be constructed on the quarry floor to facilitate drainage towards the dewatering pump.	
2.3.6 **Weather**	
This geographic area receives an average of approximately 36.5 inches of precipitation per year, with 50 percent of the precipitation usually occurring from April through August. Wind speeds up to 60 miles per hour (mph) have been recorded in the area. Temperature extremes range from about minus 100 F to near 115 "F. During summer, worker heat stress due to high humidity and high temperature must be taken into consideration when evaluating construction activities. Excavation from October through March may be delayed due to freezing conditions suspending operations. However, it is assumed that operations will be continued year-round, considering appropriate weather delays.	**Probable conditions.**
2.3.7 **Excavation Scenario**	
The performance of the bulk waste removal operation will depend on the effectiveness of the dewatering system, the type of excavation and hauling equipment furnished by the subcontractor, the plan for sequence of removal and sorting of the waste materials and, finally, the safety and health provisions that will be in force while the operation proceeds. The type of equipment suitable for excavating the waste has been discussed under Section 2.3.5 and will depend in part on the dewatering effectiveness. An alternate dewatering method is shown on Figure 2.9. This scheme takes advantage of the stability of the limestone quarry walls. A dewatering trench from the pond pumping system would be excavated along the limestone pyramid wall, assumed to have been quarried at a slope of 0.5H: IV or 0.25H: lV. The trench would be excavated adjacent to the wall up to about Station 4+50. The slope of the trench wall on the waste side would probably stabilize at about 1.5H: IV. The advantage of this dewatering scheme is that it opens up a face for drainage of 150 feet through the major part of the excavation. Figure 2.6 also illustrates a three-phase method for excavation.	**Excavation approach.**
Phase 1 excavation would commence from the northeast comer at approximately Station 10+00 and work down the slope to Station 6+25. The cuts are mostly 10 feet deep or under except for the 25-foot depth between Station 8+50 and 9+00. The estimated quantity of waste to be removed in Phase 1 is approximately 21,300 cy. Groundwater should be of minor concern in Phase 1 as the quarry floor slopes rapidly towards the deepest part of the quarry.	**Details necessary to convey exact scope of intended effort.**

Phase 2 of the excavation would commence from the side of the present quarry pond site with completion at approximately Station 5+OO. Phase2 accounts for nearly 65% of the waste. There should be adequate room behind the excavation face to permit temporary stockpiling of wastes, preliminary sorting with 4 cy front-end loaders, and loading into trucks with the 5-1/2 cy front-end loader. One-way haul roads entering and leaving the restricted area are recommended for traffic control, Phase 3 would be the final phase as the excavation progresses from Station 6+25 to the quarry fence on the west.	
Maintenance of site drainage and truck access to the sorting pile will require periodic use of a motor grader, Laborers will be required to maintain traffic in and out of the pit area and to maintain drainage ditches and culverts.	
2.4 **Interstitial Water**	
In general, drainage at the face of the excavation and along the floor of the quarry will promote the maximum amount of drainage. If the material will not drain or drains too slowly, the material may be stockpiled within the area for drying and hauling later. See Section 3.1, Hauling Methods and Precautions.	**Contingency plans.**
2.5 **Potential Problems and Uncertainties Related to Excavation**	
The primary cost concern is the extent of the unknown conditions that will be encountered when removing the heterogeneous waste material. Protective clothing, respiratory equipment, air monitoring, and safe work practices will be used to minimize or control contaminant exposures. Any cracks or crevices under the wastes will require controls to assure that drainage water does not move into the openings, carrying contamination beyond the quarry limits.	**Reasonable deviations.**
Provisions for adequate safety of personnel in the excavation area will reduce productivity and increase cost.	
The equipment selected should, under normal conditions of work, excavate from 300 to 450 cy of material per hour. This rate was reduced to 65 cy per hour to allow for the difficulties of excavating, sorting, and reloading the contaminated material into trucks, including rotation of personnel at the sorting pile and working face due to worker heat stress problems during warm weather periods. Work stoppage for data collection is another factor that will reduce the excavation rate.	**Performance factor.**
It is also possible that the excavation equipment may become contaminated to the extent that it must be retained on site and a fair appraisal price be negotiated with the excavation subcontractor. The excavation equipment will be appraised prior to mobilization of the equipment, and establishment of fair values with the selected subcontractor made prior to award of the contract.	**Contracting issue.**
The likelihood of the purchase of the subcontractor's excavation equipment will be minimized by the enforcement of periodic washdowns of the equipment.	

3.0 Bulk Waste Hauling

3.1 Hauling Methods and Precautions

-
-
-

3.2 Haul Road

-
-
-

3.2.1 Haul Road Construction

-
-
-

3.2.2 Surface Water Drainage

-
-
-

3.2.3 Dust Control

-
-
-

3.2.4 Decommissioning

-
-
-

3.3 Haul Road Traffic

Haul road traffic will consist principally of 10 to 15 cy capacity haul trucks. The maximum anticipated traffic frequency is one truck approximately every 10 minutes. For cost estimating purposes, the haul traffic is assumed to operate on a schedule of five days per week, eight hours per day, and will require at least eight months to transport all quarry waste material.

Assumptions.

All haul trucks will be surveyed after being decontaminated but prior to entering the haul road or crossing Highway 94. A decontamination pad will be provided at the quarry in conjunction with bulk waste excavation and decontamination at the chemical plant will occur at an existing facility.

Available facilities.

Decontamination will consist primarily of washing down the haul trucks with high pressure and/or low pressure water systems. Additional measures such as self-contained hot water/steam systems will be used if necessary. All sediment and wash water runoff will be collected. Decontamination pads will be regularly washed down to clean up mud and dust and to prevent carryout by wheels. All contaminated water will be collected and treated; all collected sediment will be disposed of in the temporary storage area. All trucks will be surveyed for radioactive contamination prior to leaving the quarry and chemical plant areas. 3.4 **Accidents, Bulk Waste Spills, and Emergencies** • • • **3.4.1 Public Traffic Volume/Haul Traffic Volume** • • • **3.4.2 Equipment Failure** • • • **3.4.3 Human Error** • • • **3.4.4 Road and Weather Conditions** • • •	**Wastewater management.**
4.0 Bulk Waste Segregation and Temporary Storage **4.1 Temporary Storage Area Description** **The** temporary storage area will provide facilities for storing contaminated bulk waste material removed from the quarry until it can be placed in a	**Waste management.**

permanent depository. The TSA will not redesigned for and will not be a permanent depository. Removal of wastes to a permanent facility will occur within ten years. Design criteria for the TSA are shown on Table 4.1.

Design criteria.

Table 4.1
Temporary Storage Area Design Criteria

Location Requirements

- Place 10 ft above the historical high water table
- Locate above the 100 year floodplain

Liner Requirements

- Design, construct, and install to prevent any migration of wastes to the surrounding environment
- Constructed of materials having appropriate chemical properties and sufficient thickness to prevent failure due to:
  - Pressure gradients (static head and external hydrogeologic forces)
  - Physical contact with the waste or Ieachate
  - Climatic conditions
  - Installation stress
  - Daily operation stress
  - Uneven loads
- Install to cover all surrounding earth expected to come in contact with the waste
- Having sufficient thickness to prevent migration
- Sustain integrity for a design life of 20 years
- Having a maximum permeability of 1×10^{7} cm/sec

Leachate/Runoff Collection Systems (LRCS)

- Design to contain a water volume resulting from a 25-year, 24-hr storm
- Allow no less than one foot of freeboard in the retention ponds
- Ponds will consist of a double liner and a Ieachate collection system
- Construct of materials that are
  - Chemically resistant to the waste
  - Of sufficient strength and thickness to prevent collapse under the pressures exerted by the overlying wastes, waste cover materials, and operational equipment
- Design and operate to function without clogging through the design life of 20 years

Runon Control System

- Prevent flow onto the active portion of the facility during peak discharge from a 25-year storm

Cover Requirements

- Minimize moisture infiltration
- Prevent wind dispersion of particulate matter during operations and closure
- Concentration of radon 222 shall not exceed:
  - 100 pCi/L at any point
  - An annual average of 30 pCi/L over the facility
  - An annual average of 3 pCi/L at the facility perimeter
- Provide proper drainage to the LRCS

The TSA will be located near the southwest corner of the chemical plant site (Figure 4.1) so it will be close to the haul road. As previously stated, the Weldon Spring quarry is estimated to contain approximately 95,000 cy of heterogeneous in-place materials including contaminated soil, concrete, steel, drums, building materials, and miscellaneous equipment. The materials will be characterized at the TSA, but preliminary sorting based on visual inspection will be accomplished at the quarry as space and logistics permit during excavating and sorting operations. This process includes determining the quantity of solids or liquids remaining in buried drums in the quarry and determining the condition of the drums. Drums that are encountered intact will be overpacked at the quarry for characterization at the chemical Plant site.	**Storage approach.**
The TSA, covering approximately 13 acres, will be designed to store approximately 140,000 cy of excavated material, which includes all quarry bulk waste material and all contaminated materials from the quarry construction staging area. The design volume will accommodate variations in the quantities of contaminated materials due to swelling of excavated material and provides some allowance for over-excavation that may occur. A contingency of at least 15 percent (based on engineering judgment) has been allowed in each sorting catego~. This excess capacity will provide flexibility in the sorting and temporary storing of materials as they are further characterized. Should the quantity of a given category exceed the contingency, excess material would be stored with a different category, separated by geotextile fabric. All wastes will be managed in accordance with the Waste Management Plan (MKF and JEG, July 1989b).	**Reasonable deviation.**
Contaminated materials will be transported to the TSA by haul trucks on a haul road entering at the southern end of the chemical plant site near the railroad easement. The haul trucks will proceed to the TSA receiving/sorting area to discharge contents (see Figure 4.2, Section 4.3) for sorting prior to placement in the storage area. All haul trucks will then be cleaned at a nearby vehicle decontamination pad before exiting the chemical plant site. The receiving/sorting area will be a reinforced concrete pad suitable for haul trucks and front-end loaders. The storage area will have separate sub-areas for materials based on their physical or chemical characteristics. It may be advantageous to cover the unloading/sorting area with a building if significant dust control efforts are required. A structure could be made available as a contingency measure under the observational approach. Cost for such a structure would be included in the CDD estimates.	**Contingency Plans.**
All stormwater runoff and leachate from the TSA will drain by ditches and swales to collection ponds within the TSA. The stormwater runoff and drainage system will be designed for a 25-year, 24-hour storm (approximately 5.67 inches of rainfall in 24 hours). These collection ponds will be sized to accommodate the design storm with one foot of freeboard provided. The design will also include a double liner and a leachate collection system.	**Reasonable deviations.** **Design criteria.**
Design flow rates of the run-on control system will be based on a 25-year storm event with a minimum time of concentration of 2.5 minutes. Erosion protection of ditches will normally be limited to grass lining. Diversion	**Design criteria.**

ditches will reutilized to route surface water away from the TSA (see Section 4.1.2, Environmental Concerns).	
The TSA pad and liner will be of sufficient strength and thickness to prevent failure due to uneven loads, physical contact with the waste or leachate, climatic conditions, stress of installation, stress of daily operation, or the stress of loading material on and off of the storage area. It will be placed on a foundation capable of providing support to the liner and resistance to uneven loads above and below the liner due to settlement, compression, or uplift. A geotechnical characterization program will form the basis for defining specific construction practices to ensure that the design criteria are met. The waste storage area's base pad will accommodate the anticipated live and dead loads with consideration for long-term settlement.	**Performance standard.** **Design studies.**
The pad will consist of asphalt concrete surfacing underlain by a compacted aggregate base course over a 12-inch minimum thickness of recompacted in-place clay having a maximum permeability of 10^{-7} cm/sec or equivalent.	
The design life of the drainage facilities and pavements will be ten years of operation. During this period these facilities will be maintained in order to protect the environment.	
Although the TSA is currently designed for an operational life of 10 years, extending the design life could be accomplished if the following factors are assured:	
• The 12-inch compacted clay liner is adequate for additional life. • The asphaltic concrete base is designed as a working surface. Access ways need to be maintained throughout the life of the TSA. • Wastes subject to dispersion will be covered with liners. Additional cover may be needed over the liners to protect against long-term weathering and exposure. • Standard monitoring and maintenance procedures including liner inspection and repair should continue along with regrading the aggregate surfaced perimeter road.	**Potential methods and means to be considered by the design team.**
4.1.1 **Construction of the Temporary Storage Area** • • •	

4.1.2 Environmental Concerns Environmental safety is a prime consideration in the design of the TSA, since the facility will be storing contaminated material. The primary means by which contamination could spread is by surface water runoff/run-on, groundwater infiltration/percolation and wind. Good engineering practices will be implemented to prevent and/or mitigate the spread of chemical and radiological contamination. During its period of operation, the TSA will satisfy the substantive requirements of applicable regulations and of this document.	**Performance standard.**
A surface water runoff collection system will direct all runoff into retention basins to avoid the spreading of contamination to natural surface water, soil and groundwater. The retention basins will be lined with compacted clay and flexible membrane. Surface water run-on will be controlled by the use of diversion ditches to prevent contamination of clean surface water. The diversion ditches will be grassed waterways. Other applicable erosion control measures will be taken to ensure segregation of surface water runoff and run-on (contaminated vs non-contaminated). Potential contamination due to infiltration into the groundwater will be minimized by the underlying liner. Minimizing negative impacts on air quality during the storage of materials is another objective. Wind-blown particulate from the fine-grained materials storage area will be controlled through dust suppression methods. Periodic spraying with water and/or dust suppressants will be used to control windblown matter while the pile is being constructed. When a section of the pile is completed, a more permanent control measure, such as placing a flexible membrane over the fine grained materials, will be used. As mentioned in Section 4.1.1, Construction of the Temporary Storage Area, all erosion control measures will be specified in the CDD. 4.1.3 **Radon Gas Control** • • • **4.1.4 Decommissioning of the Temporary Storage Area** • • • **4.2 Criteria for Bulk Waste Segregation** • • •	**Thickness and other specifications left to design team.**

4.3 Segregation and Handling Techniques • • • **4.4 Operation and Maintenance of Temporary Storage Area** • • • **4.5 Potential Problems and Uncertainties Related to Temporary Waste Storage** • • • **5.0 Proposed Method of Accomplishment** **5.1 Subcontract Packages**	**Contracting approach.**
The removal of bulk waste from the quarry to the TSA is currently planned to be accomplished utilizing three separate subcontract packages as described below. 5.1.1 Haul Road Construction This subcontractor will construct a haulroad from the quarry to the temporary storage area at the chemical plant site. 5.1.2 Temporary Storage Area Construction This subcontractor will construct the temporary storage area at the chemical plant. The temporary storage area will be a large asphalt-paved area with asphalt berms and ditches for stormwater runoff and leachate collection. 5.1.3 Bulk Waste Excavation This subcontractor will be responsible for the following activities: clearing and grubbing of the area within the fenced quarry area; any dewatering which may be necessary in addition to the pumping of the quarry pond; excavation of the bulk wastes, preliminary sorting at the quarry, and hauling to the temporary storage area at the chemical plant; maintenance of the haul road; and operation and maintenance of the temporary storage area during this period including additional sorting as may be required.	

5.2 Cost Estimates

5.2.1 Basis of Estimates

Preliminary cost estimates have been prepared for the temporary storage area, haul road, and bulk waste excavation in accordance with preliminary sketches and drawings. Considering the preliminary status of the available sketches and drawings and the nature of the work, a contingency allowance of at least 30 percent should be considered for budget purposes.

Additional detailed backup for cost estimates should be available to support the estimates given here.

The labor rates used in these estimates are the Davis-Bacon rates for St. Charles County, Missouri effective April 1988. The equipment rates used in the estimates are based on general industry standards and include repair and service labor but not operating labor.
The following allowances have been added to the direct costs:

- Small tools and supplies -7 percent of Labor
- General expense and overhead -25 percent of Labor, Permanent Materials, Equipment, Supplies and Subcontractors
- Profit -10 percent of Labor, Permanent Materials, Equipment, Supplies and Subcontractors
- Hazardous Waste Insurance Surcharge -20 percent of Total Direct & Indirect Cost
- Equipment Surcharge - 15 percent for Filtered Air Ventilation System

5.2.2 Project Durations and Cost Estimates

An estimated range of individual project durations and costs are shown below. The durations of the projects are dependent upon the methods used by the subcontractors and available funding.

	Duration (weeks)	cost W$)
Temporary Storage Area	12	1.4- 1.8[a]
Haul Road	16	0.7-0.9’
Bulk Waste Excavation	36-65	2.9- 6.7[a]

[a]Includes 30% contingency allowance.

Submodule 4.4 Engineering Evaluation/Cost Analysis or Focused Feasibility Study

Non-Time-Critical Removal Actions and Early Remedial Actions

- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- **4.4 EE/CA or FFS**
- 4.5 Conceptual Design
- 4.6 Remedy Selection and Documentation

4.4 EE/CA or FFS:

- 4.4.1 Engineering Evaluation /Cost Analysis
- 4.4.2 Focused Feasibility Study

Background

An EE/CA is written for a non-time-critical removal and an FFS is written for an early or interim remedial action. The purposes of an EE/CA or an FFS report are similar, even if their format is somewhat different. The similar purposes of the documents are:

- To identify a threat and thus establish the need for an early action
- To summarize the characterization of the site as related to the action alternative(s)
- To establish the objectives of the early action
- To describe the alternative(s)
- To analyze the alternative(s) against established criteria

Minor format differences of the documents are:

- The EE/CA is multi-purpose, presenting the results of the removal site evaluation including results of the LFI if conducted; an FFS generally does not present the results of the LFI (a separate technical memorandum or report would be used).

- An EE/CA analyzes the alternative(s) against only three removal action criteria– (1) effectiveness, (2) implementability, and (3) cost. An FFS analyzes the alternative(s) against the first seven criteria in the NCP, which are required considerations for remedial actions.

- An EE/CA includes a recommendation of a particular removal alternative. An FFS does not include a recommendation (although it may evaluate as few as one alternative); that function is served by the separate Proposed Plan.

- The outlines and contents of the two reports are somewhat different.

The EE/CA or FFS is kept as brief and efficient as possible regardless of the type of early action being considered. This is possible, in part, because an early action process does not begin with a question about the possible need for action; it begins with a conclusion that action is required and, usually, a presumption about the necessary nature of the action.

However, EE/CAs and FFSS have often been much longer than required. Many **EE/CAS and FFSS have** been virtually indistinguishable from comprehensive FSS, thus forfeiting much opportunity for streamlining the study phase and the review of the results. As with an early action work plan, no firm guidance can be given (some site problems are truly complex); however, limiting FFSS and EE/CAs to fewer than 100 pages (including tables and figures) should be possible for most early actions.

This page intentionally left blank.

Organization

Submodule 4.4.1, EE/CA Development and Submodule 4.4.2, FFS Development discuss the following:

- Statement of site problem(s)
- Reviewing and finalizing remediation objectives
- Defining alternative(s) for analysis
- Analysis of alternative(s)
- Developing EE/CA or FFS

In addition, more detailed information is provided in the following notes:

- Note A – Example EE/CA Format
- Note B – Example FFS Report Format

Sources

1. U.S. EPA, August 1993(b), *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCA, EPA/540/R-93/057,* OSWER Directive 9360.0-32.

2. DOE, December 1993, *Remedial Investigation/Feasibility Study (MIFS) Process, Elements, and Techniques Guidance, DOEIEH-94007658.*

3. DOE, September 1994, *CERCM Removal Actions, DOEIEH-0435.*

4. 40 CFR 300, March 8, 1990, *National Oil and Hazardous Substances Pollution Contingency Plan,* Federal Register, Vol. 55, No. 46 Rules and Regulations.

Submodule 4.4.1 Engineering Evaluation/Cost Analysis

Non-Time-Critical Removal Actions and Early Remedial Actions

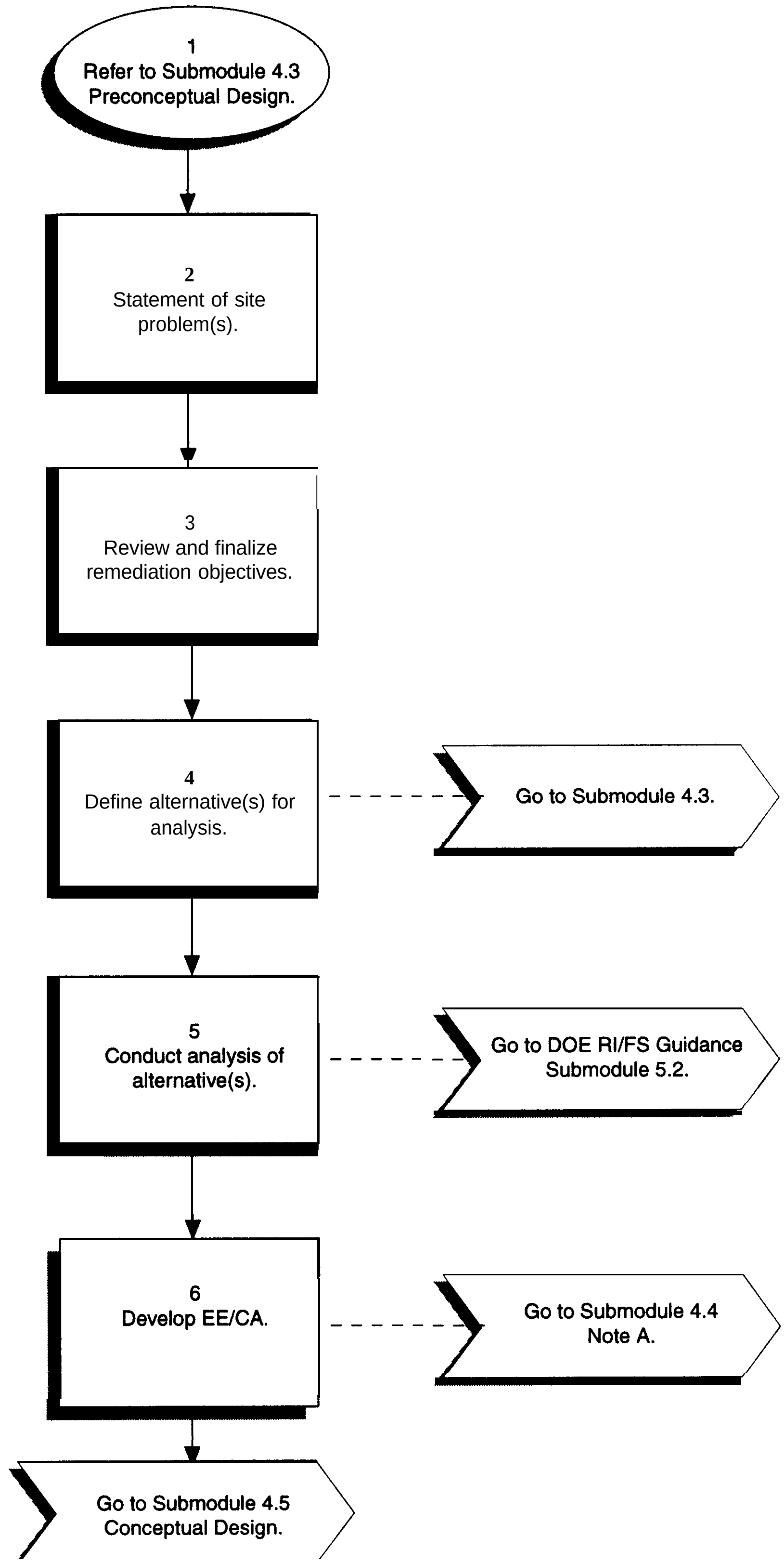
- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- **4.4 EE/CA or FFS**
- 4.5 Conceptual Design
- 4.6 Remedy Selection and Documentation

4.4.1 Engineering Evaluation / Cost Analysis

- Statement of Site Problem(s)
- Reviewing and Finalizing Remediation Objectives
- Defining Alternative(s) for Analysis
- Analysis of Alternative(s)
- Developing EE/CA

This page
left blank.

Submodule 4.4.1 Engineering Evaluation/Cost Analysis



Submodule 4.4.1 Engineering Evaluation/Cost Analysis

Step 1. Refer to Submodule 4.3, Preconceptual Design.

Step 2. **Statement of site problem(s).** The understanding of the site problem(s) initially developed in the consensus memorandum (and further developed in the work plan) should be updated in accordance with the LFI (if any) or any other additional site evaluation that has been performed. This statement of understanding will be used both in the EE/CA and subsequently in the Action Memorandum. The statement of the site problems should be focused on those aspects most relevant to the early action, but should also include an understanding of how the early action will affect the subsequent remediation of other site problems.

Step 3. **Review and finalize remediation objectives.** The remediation objectives initially developed in the consensus memorandum (and refined in the work plan) should be reviewed by the extended project team and revised in accordance with the LFI (if any) or any other additional site evaluation that has been performed. The statement of the objectives becomes a critical starting point for the design efforts (see Submodule 4.5, Conceptual Design) and will be one of the primary issues of consensus for the extended project team during the decision process (see Submodule 4.6, Remedy Selection and Documentation).

Step 4. **Define alternative(s) for analysis.** The alternative(s) under consideration have been defined in the preconceptual design (see Submodule 4.3, Preconceptual Design). They are incorporated in the EE/CA directly from those efforts. A "no-action" alternative is not required for a removal action.

Step 5. **Conduct analysis of alternative(s). The** EE/CA analyzes the alternative(s) against three criteria: (1) effectiveness, (2) implementability, and (3) cost. The analysis required is explained in *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (EPA, 1993).* Additional direction can be found in DOE's RI/FS guidance, Submodule 5.2.

Step 6. **Develop EE/CA.** Submodule 4.4, Note A provides the suggested outline for an EE/CA. The EE/CA should be kept as short as practically possible. The site evaluation and decision process are not as extensive or as exhaustive as an RI/FS, and the documentation does not need to be as elaborate or detailed as a comprehensive FS. While no firm guidance can be given, an EE/CA most often can be kept well under one hundred pages including tables and figures. Additional information on the preparation of an EE/CA is presented in *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (EPA, 1993).*

Submodule 4.4.2 Focused Feasibility Study

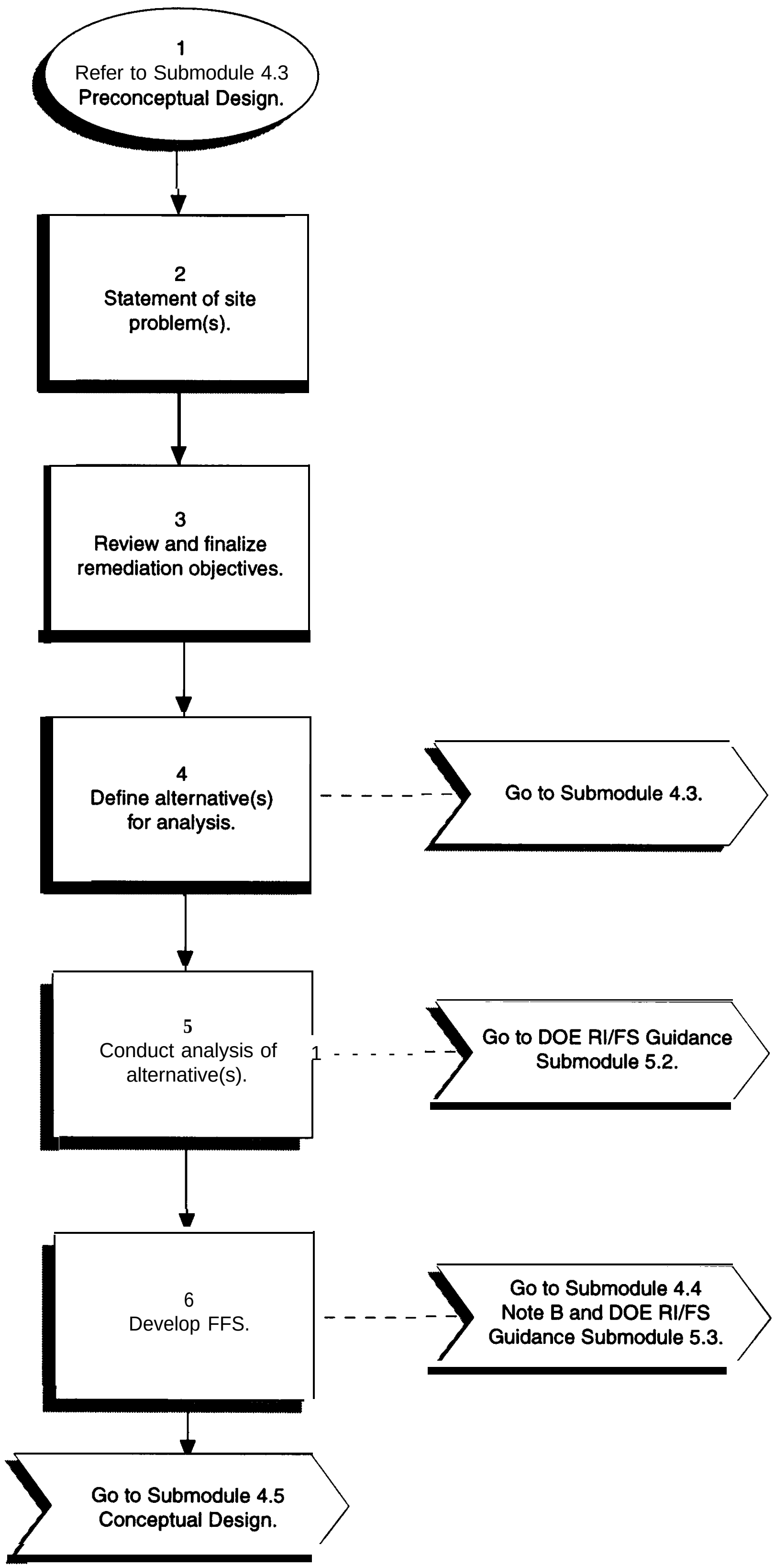
Non-Time-Critical Removal Actions and Early Remedial Actions
4.1 Scoping
4.2 Limited Field Investigations
4.3 Preconceptual Design
4.4 EE/CA or FFS
4.5 Conceptual Design
4.6 Remedy Selection and Documentation

4.4.2. Focused Feasibility Study

- Statement of Site Problem(s)
- Reviewing and Finalizing Remediation Objectives
- Defining Alternative(s) for Analysis
- Analysis of Alternative(s)
- Developing FFS

This page intentionally left blank.

Submodule 4.4.2 Focused Feasibility Study



Submodule 4.4.2 Focused Feasibility Study

Step 1. Refer to Submodule 4.3, Preconceptual Design.

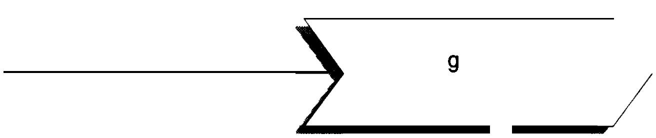
Step 2. **Statement of site problem(s).** The understanding of the site problem(s) initially developed in the consensus memorandum (and further developed in the work plan) should be updated in accordance with the LFI (if any) or any other additional site evaluation that has been performed. This statement of understanding will be used both in the FFS and subsequently in the Proposed Plan and ROD. The statement of the site problems should be focused on those aspects most relevant to the early action, but should also include an understanding of how the early action will affect the subsequent remediation of other site problems.

Step 3. **Review and finalize remediation objectives.** The remediation objectives initially developed in the consensus memorandum (and refined in the work plan) should be reviewed by the extended project team and revised in accordance with the LFI (if any) or any other additional site evaluation that has been performed. The statement of the objectives becomes a critical starting point for the design efforts (see Submodule 4.5, Conceptual Design) and will be one of the primary issues of consensus for the extended project team during the decision process (see Submodule 4.6, Remedy Selection and Documentation).

Step 4. **Define alternative(s) for analysis.** The alternative(s) under consideration have been defined in the preconceptual design (see Submodule 4.3, Preconceptual Design). They are incorporated in the FFS directly from those efforts. A "no-action" alternative is required for an early remedial action or an interim remedial action.

Step 5. **Conduct analysis of alternative(s).** The FFS analyzes the alternative(s) against seven criteria: (1) protectiveness, (2) ARARs compliance, (3) long-term effectiveness and permanence, (4) reduction of toxicity, mobility, or volume through treatment, (5) short-term effectiveness, (6) implementability, and (7) cost. The analysis required is explained in Submodule 5.2 of DOE's RI/FS guidance (DOE, 1993).

Step 6. **Develop FFS.** Submodule 4.4, Note B provides a suggested outline for an FFS. The FFS should be kept as short as practically possible. The site evaluation and decision process are not as extensive or as exhaustive as an RI/FS, and the documentation does not need to be as elaborate or detailed as a comprehensive FS. While no firm guidance can be given, an FFS most often can be kept well under one hundred pages. Additional information on the preparation of an FFS is presented in Submodule 5.3 of DOE's RI/FS guidance (DOE, 1993).


g

Note A. **Example EE/CA Format.**

Executive Summary

1. Site characterization
   - 1.1 Site description and background
   - 1.2 Previous removal actions
   - 1.3 Source, nature, and extent of contamination
   - 1.4 Analytical data
   - 1.5 Risk evaluation (as based on consensus memorandum)

2. Identification of removal scope, goals, and objectives
   - 2.1 Statutory limits on removal actions
   - 2.2 Understanding of site problem(s)
   - 2.3 Removal action objectives
   - 2.4 Determination of removal scope

3. Identification of removal action alternatives
   - 3.1 Description of Alternative 1
     - 3.1.1 Scope
     - 3.1.2 Contingency plans
     - 3.1.3 Cost estimate
   - 3.2 Description of Alternative 2 (if any)
     - 3.2.1 Scope
     - 3.2.2 Contingency plans
     - 3.2.3 Cost estimate

4. Analysis of removal action alternatives
   - 4.1 Individual Analysis
     - 4.1.1 Alternative 1
       - 4.1.1.1 Effectiveness
       - 4.1.1.2 Implementability
       - 4.1.1.3 cost
     - 4.1.2 Alternative 2 (if any)
       - 4.1.2.1 Effectiveness
       - 4.1.2.2 Implementability
       - 4.1.2.3 Cost
   - 4.2 Comparative analysis of alternatives
     - 4.2.1 Effectiveness
     - 4.2.2 Implementability
     - 4.2.3 Cost

5. Recommended removal action alternative

Appendices (as needed)
- A. Detailed data from the LFI
- B. Backup information for the cost estimates
- C. Backup information for the ARARs analysis

This page intentionally
left blank.

Note B. **Example FFS Report Format.**

Executive Summary

1. Introduction
   - 1.1 Purpose and organization of report
   - 1.2 Background information (summarized from work plan or LFI technical memorandum)
     - 1.2.1 Site description
     - 1.2.2 Site history
     - 1.2.3 Nature and extent of contamination [only as directly related to the envisioned removal action and the problem(s) it will address]
     - 1.2.4 Contaminant fate and transport [only as directly related to the envisioned removal action and the problem(s) it will address]
     - 1.2.5 Risk evaluation (as based on consensus memorandum)

2. Early action objectives
   - 2.1 Site problem/scope of early action
   - 2.2 Early action objectives
   - 2.3 Regulatory issues
   - 2.4 Schedule

3. Identification and definition of alternative(s)
   - 3.1 Identification of alternative(s)
   - 3.2 Description of defined alternative(s)
     - 3.2.1 Alternative 1
     - 3.2.2 Alternative 2 (if any)

4. Detailed analysis of alternative(s)
   - 4.1 Introduction
     - 4.1.1 Purpose of analysis
     - 4.1.2 The NCP criteria
   - 4.2 Individual analysis of alternatives
     - 4.2.1 Alternative 1 (vs the seven criteria)
     - 4.2.2 Alternative 2 (vs the seven criteria)
   - 4.3 Comparative analysis (if more than one alternative)

Appendices (as needed)
   - A. Detailed data from the LFI
   - B. Backup information for the cost estimates
   - c. Backup information for the ARARs analysis
   - D. Backup information for the focused risk assessment

Submodule 4.5 Conceptual Design

Non-Time-Critical Removal Actions and Early Remedial Actions	
4.1	Scoping
4.2	Limited Field Investigations
4.3	Preconceptual Design
4.4	EE/CA or FFS
4.5	Conceptual Design
4.6	Remedy Selection and Documentation

4.5 Conceptual Design
• Completing the Conceptual Design
• Preparing the Design Criteria Document
• Use of the Design Criteria Document

Submodule 4.5 Conceptual Design

Background

Following development of the preconceptual design (see Submodule 4.3, Preconceptual Design), design efforts can continue in parallel with the EE/CA or FFS and as the decision and documentation stages proceed. The conceptual design is completed at this time and then, after the Action Memorandum or ROD is signed, is developed further into a design criteria document. DOE Order 4700.1 requires development of a Design Criteria Document for many types of DOE construction projects; this DOE order does not strictly apply to environmental restoration projects, but the concept of a decision criteria document is standard engineering practice.

The Design Criteria Document presents and explains all of the fictional requirements that will have to be met by the remediation efforts. Early development of complete and detailed criteria for the early action facilitates orderly progress of the final design phase.

Development of the design criteria represents a significant point in the early action process. This is the final point at which the considerations in the decision process directly influence the considerations in the design process. All considerations are technical from this point, through implementation of the early action.

Throughout the early action process, from the development of the phased approach strategy and consensus memorandum to this point, two interdependent processes have proceeded in parallel:

(1) A public *decision* process, which is strongly influenced by the technical imperatives identified by the technical members of the extended project team working to understand the site problem(s) and the feasible methods of addressing it

(2) A technical *design* Process, which is strongly influenced by the regulatory and stakeholder concerns identified by the other members of the extended project team working through the decision process

The public decision process works out what is *necessary (e.g.,* ARARs compliance or waivers, remedial objectives, cleanup levels). The technical design process works out what is *possible (e.g.,* maximum sustainable pumping rates, minimum feasible treatment levels, minimum time to achieve full remediation).

The public decision process reaches an end at the signing of the Action Memorandum or ROD. From this point, the implementation of the early action should be nearly a pure technical project with allowances for the normal non-technical issues that any construction project must address (e.g., traffic regulations, NPDES limitations, hazardous waste manifest requirements).

Organization

Submodule 4.5 discusses the following:

- Completing the Conceptual Design
- Preparing the Design Criteria Document
- Use of the Design Criteria Document

This page intentionally left blank.

In addition, more detailed information is provided in the following note:

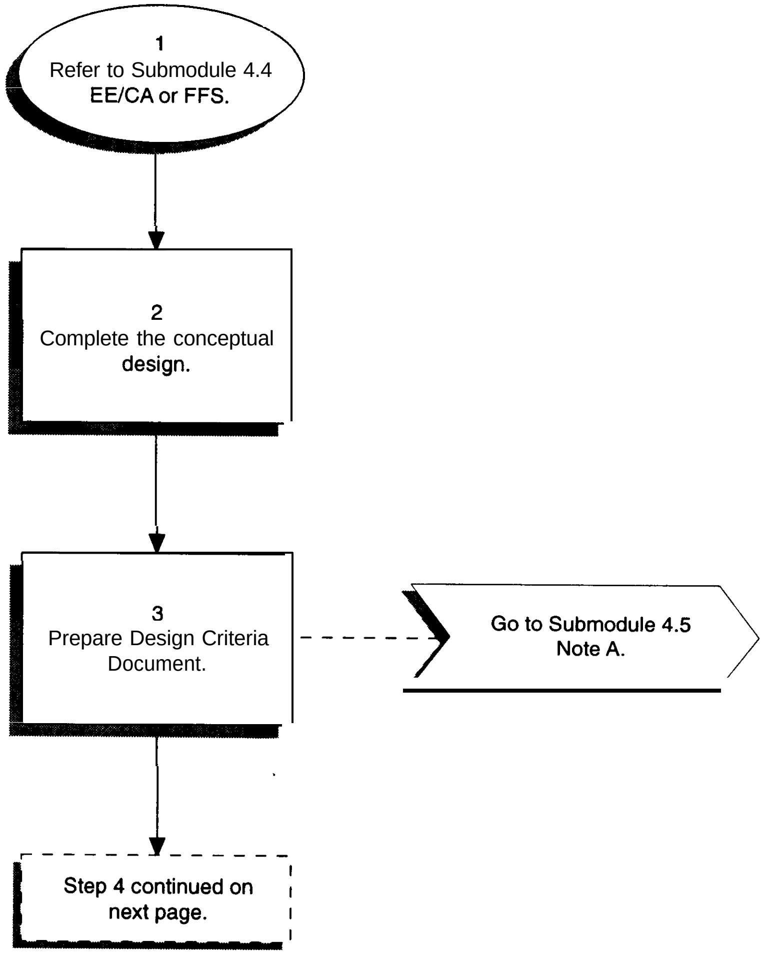
- Note A –Example Text for Design Criteria Document

Sources

1. DOE, September 1994, CERCLA *Removal Actions, DOE/EH-0435.*

2. **40 CFR 300, March 8, 1990,** *National Oil and Hazardous Substances Pollution Contingent Plan*, Federal Register, Vol. 55, No. 46 Rules and Regulations.

Submodule 4.5 Conceptual Design



Step 1. Refer to Submodule 4.4, Engineering Evaluation/Cost Analysis or Focused Feasibility Study.

Step 2. **Complete the conceptual design.** The conceptual design defines all of the major features of the final design for the early action. This phase is generally thought of as the 30 percent design stage. Under ideal conditions, 70 percent of the design budget should remain at the end of the conceptual design to finalize (during final design) the multitude of details regarding how the early action will be carried out. But, all of the major features are decided at the completion of the conceptual design and the design is "frozen" from further changes in its major elements. The remaining design budget is committed to the final design effort, which is beyond the scope of this guidance document.

Conceptual design and final design are standard concepts in engineering practice and are well understood by the engineering community. Guidance on managing design and construction projects at DOE facilities is available as supplements to DOE Order 4700.1. [Please note that, at this writing, DOE is in the process of revising project management guidance for ER projects. Consult with EM-43, Office of Program Integration.]

Step 3. **Prepare Design Criteria Document.** The final decisions in the Action Memorandum or ROD may place additional requirements on the remediation not anticipated in the preconceptual design. For example, an expected waiver of an ARAR may not be included in the decision document, thus necessitating changes in the design criteria. Thus, the final design criteria derive from both the conceptual design and from the final decision document. The DOE project manager or designee is responsible for ensuring that the design criteria reflect all of the requirements and objectives in the Action Memorandum or ROD.

Development of the design criteria actually began when the need for the early action was identified and initial concepts for a remedial approach were delineated. The majority of the criteria were developed and validated during preconceptual design. The purpose of establishing very specific design criteria is to ensure that the final design will meet all of the remediation objectives in the Action Memorandum or ROD.

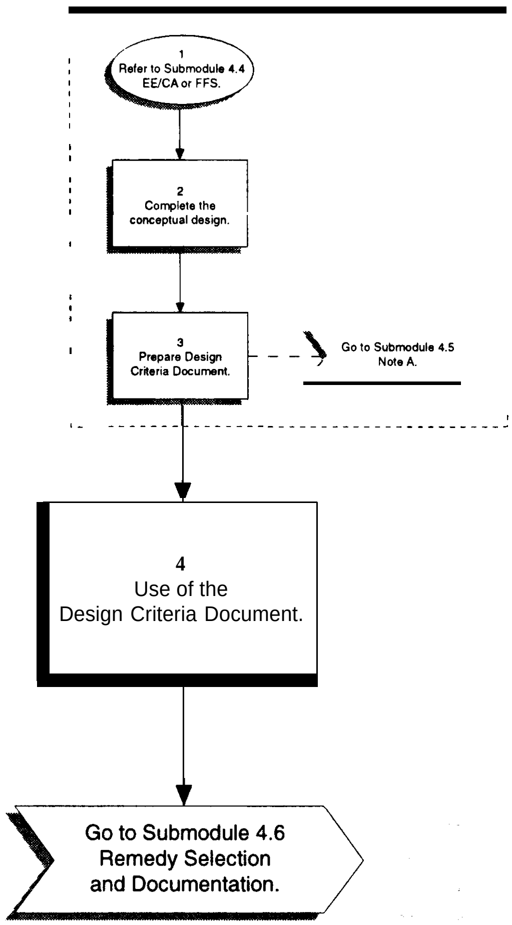
Completeness and clarity of the design criteria are the most important factors in this stage of the early action process. However, completeness should not be affected such that the design team is narrowly constricted in acceptable design approaches. The criteria should represent the *essential minimum requirements* that the final remediation must meet, but all possible flexibility should be retained.

A few examples can clarify the concept of design criteria:

- Required pumping rates for the extraction system are projected to be between 18 and 32 gallons per minute (gpm). The treatment system shall be provided with flow equalization capability and/or treatment capacity to handle sustained flows over a 24-hr period as low as 15 gpm and as high as 40 gpm.

- A paved, bermed, and storm water-controlled staging and turnaround area shall be provided to handle one actively loading 15-yd dump truck and two waiting 15-yd dump trucks.

Submodule 4.5 Conceptual Design (cont.)



- The berms on the impoundments shall be stabilized through adequately designed upgrades to withstand a maximum credible earthquake. For the purposes of this design, the maximum credible earthquake is defined to involve horizontal accelerations up to 0.7 g.

Submodule 4.5, Note A provides example text for a Design Criteria Document.

Step 4. **Use of the Design Criteria Document.** Much of the text of the design criteria document will be incorporated directly in the design criteria package after the Action Memorandum or ROD is signed, and thus will be incorporated in the scope of work given to the design team for final design.

Once the design criteria document is complete, additional materials are added to assemble the design criteria package (sometimes called a design basis report). This step requires assembling a great amount of material, some of which may have to be changed if the selected alternative differs from the preferred alternative as presented in the Draft Action Memorandum or Proposed Plan. Preparing the design criteria package is beyond the scope of this document.

Additional information on design criteria packages is provided in Chapter 5 of DOE Order 4700.1.

This page intentionally left blank.

Note A. **Example Text for Design Criteria Document. This** example of a section for a design criteria document is taken from a draft Design Basis Report for the Bayou Bonafuca Site in Louisiana. It addresses only one element of the overall remedial action for the site – relocating a drainage channel. It exemplifies the level of detail and specificity that should be possible in the design criteria document for an early action site.

Any of the methods or means listed may change during final design. The details are listed to portray very clearly to the design team the final result desired, as well as the limitations that must be accounted for and the potentially acceptable approaches that should be considered for the final design. In contrast to the detailed methods and means, the objectives and overall approach cannot be modified by the design team without the concurrence of the extended project team.

4.3 EAST DRAINAGE CHANNEL RELOCATION

4.3.1 SCOPE AND OBJECTIVE

The engineered drainage channel (EDC) is located in the east portion of the property; since it bisects the area planned for the incineration facilities, it will be relocated to within 25 feet of the east property boundary as shown in Figure 3-2.

Integrating political decisions (i.e., ROD requirements) with technical possibilities.

The ROD specifies that contaminated sediments and soils in the EDC will be excavated and incinerated. The excavation should also include the dredge spoils on both sides of EDC; it should extend 50 feet from the EDC and it should not extend deeper than 3 feet,

Expected conditions.

Previous investigations indicated that the area of the EDC is underlain by con tarninated sediments; the depth of the contamination increases from north to south and ranges from 2.6 to 6.1 feet below the mudline. All borings in the area indicated at least 1 foot of high plasticity clay at the bottom; the clay was relatively uncontaminated in all borings except for boring EDC- 1 where the contamination extended 3 feet into it. Excavations for the relocated EDC are assumed to be in uncontaminated soils.

4.3.2 SPECIFICATIONS REQUIREMENTS

Level of design required.

The EDC specifications will be of a detailed mode except, for some minor parts of work such as the construction dewatering. The specifications will include the cross-sections and alignment of the new EDC, excavation cross sections for the old EDC (to be approved by the EPA), sequence of excavation, methods of the old channel backfilling, dewatering requirements, and treatment of water from dewatering. The excavation dredgelines will be provided in the intermediate design.

Contractor requirements.

The Contractor will be required to submit a detailed schedule on the excavation and backfilling of the EDC, methods of dealing with water from construction dewatering, and methods of protection or demolition of the groundwater recovery wells along the old EDC channel.

4.3.2.1 New Channel Excavation

Functional design requirements.

The new channel cross section will be designed so that the invert elevation closely coincides with the old channel. The side slopes will be 2(H): 1 (V). Clean soils from the excavation will be temporarily stored and used for the backfill of the old channel. Following the excavation, water from the old channel will be diverted into the new channel.

The construction of the new EDC will be specified by detailed design. The design will have to be verified by the COE for the hydrologic assumptions and criteria used.

4.3.2.2 Old Channel Excavation	
The sediments and contaminated soils in the EDC will be excavated to dredge lines specified on cross sections in the design and approved by EPA. The depth of the dredgelines below the channel bottom will range between 3 feet at the boring EDC-4 location to 7.5 feet at the south end of the EDC. The design channel cross section has side slopes 1(H): l(V); flatter slopes will be specified if stability problems are encountered during the excavation.	Design performance requirement.
Dredge spoils on each side of the ditch will need to be excavated in lifts; 1-foot lifts should be used with a maximum excavation depth of 3 feet. The excavation will be performed to a maximum of 50 feet from the edge of the EDC.	Design specification.
All sediments from the EDC will be incinerated; the soil from both sides of the channel will be sampled according to a grid pattern and tested; soil with contamination of >1,000 ppm total PNA's will be incinerated; soils with contamination between 100 and 1,000 ppm total PNA's will be deposited in the landfill.	
The Contractor will be required, during the excavation and during the following channel backfill, to provide dewatering of the excavation from construction activities so that the groundwater levels are maintained below the - excavation bottom. Water from the dewatering system will be treated before discharge to the Bayou. Discharge limits will be specified in the wastewater treatment specifications.	Design performance requirement.
The earthwork at the EDC may interfere with the operation of the wells along the west edge of the channel in the ground water recovery system. According to EPA, these wells should be operational between March 1991 and March 1992. If the wells are operating during the Contractor's work at the EDC, the Contractor will provide well protection; if the wells are abandoned, the Contractor will demolish the wells according to procedures to be specified.	
4.3.2.3 Temporary Soil Storage	
Excavated soils to be incinerated may have to be stored temporarily, as neither the incinerator nor the landfill may be functional during the time of the excavation.	
Temporary storage will have to be provided at the location of the future landfill. This temporary storage will have to include a bottom liner, a flood protection dike, and a temporary cap, consisting of 6 inches of clay or of a plastic cover such as Griffolyn. The size of this temporary storage is assumed to be on the order of 0.25 acres.	Design specification.

4.3.2.4 Old Channel Backfill Following the excavation, the old channel will be backfilled to the elevation of the existing surface. Because the area of the old EDC will be used for the incineration facilities, the channel backfill will be designed as a structural fill. The backfill material will be from the excavation for the new EDC and from offsite borrow sources. Contamination testing will be required for all onsite materials used as backfill. Construction dewatering will be required during the backfill of the old EDC. It must be assumed that the water from the dewatering system will be contaminated. The Contractor will secure water treatment either in the new water treatment facility if already constructed or in the groundwater recovery water treatment facility. If water treatment cannot be provided, the water will be stored for future treatment. **4.3.3 ASSUMED APPROACH FOR COST AND SCHEDULE** It is assumed that the new EDC will be excavated to the specified dredgelines without any need for dewatering except for pumping from sumps. Soils from the excavation will be tested for contamination and temporarily stored. Water from the old EDC will be diverted into the new channel and the old channel will be isolated by cofferdams. The excavated old EDC sediments and soils will be stored temporarily on the landfill site; storage will require a temporary liner both under and over the waste pile. According to preliminary volume calculations, we expect that the total volume of the contaminated sediments will be between 4,300 and 6,000 yd^3. Total volume of soils and sediments from the EDC sides (including dredged spoils adjacent to the channel) is estimated between 6,300 and 11,300 yd^3. Backfilling of the old EDC will use, as a source, uncontaminated soils obtained from the new EDC excavation and, if necessary, borrow material from offsite sources. We assume that sand from identified sources (within 15 miles offsite) will be used.	**Design functional requirement.** **Expected conditions.** **Design functional requirement.** **Expected conditions.**

This page intentionally left blank.

Submodule 4.6 Remedy Selection and Documentation

Non-Time-Critical Removal Actions and Early Remedial Actions

- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- 4.4 EE/CA or FFS
- 4.5 Conceptual Design
- **4.6 Remedy Selection and Documentation**
  - 4.6.1 Non-Time-Critical Removal Actions
  - 4.6.2 Early Remedial Actions

Background

The decision document for a non-time-critical removal action is an Action Memorandum. The decision document for an early remedial action is a ROD. EPA has published an Action Memorandum Guidance (EPA, 1990) and ROD guidance (EPA, 1989). The ROD guidance addresses both early and interim final actions. The requirements for action memoranda are different from the requirements for a ROD, but significant commonality exists in the contents and purposes of the two documents.

The primary purposes of both documents are:

- To identify the authority under which the response action will be taken

- To document that an action is required to protect public health and/or the environment and that expenditure of DOE funds for the response is justified. (Protecting public health and the environment is the fundamental purpose of CERCLA and of any response action taken under the act.)

- To describe the action that has been selected as the appropriate response, within the decision document, or partly by reference to more detailed descriptions elsewhere

- To explain the reasons for the particular response that has been selected. For an Action Memorandum, this justification is primarily in terms of three criteria: effectiveness, implementability, and cost (EPA, 1990). For a ROD, this explanation is primarily in terms of the nine NCP criteria.

- To present the conclusions of DOE, EPA, and the State on the regulatory requirements that apply to the response action (ARARs) and how each will be met or, if appropriate, waived

- To describe the public participation process that has been followed in identifying and selecting the response action

Organization

Submodule 4.6.1 discusses remedy selection and documentation for non-time-critical removal actions including:

- Stakeholder meeting
- Preparation of the Draft Action Memorandum
- Preparation of the Administrative Record
- Public comment period
- Preparation of the Final Action Memorandum
- Update Administrative Record and provide public access
- Publication of the Action Memorandum
- Post-decision document changes

This page intentionally left blank.

Submodule 4.6.2 discusses remedy selection and documentation for early remedial actions including:

- Stakeholder meeting
- Preparation of the Proposed Plan
- Preparation of the Administrative Record
- Public comment period
- Preparation and finalization of the ROD
- Update Administrative Record and provide public access
- Publication of the ROD
- Post-decision document changes

In addition, more detailed information is provided in the following note:

- Note A – EPA-Specified Outline for an Action Memorandum

Sources

1. U.S. EPA, June 1988, *Community Relations in Supefund: A Handbook, Interim Version, EPA/540/6-88/O02,* OSWER Directive 9230.0.38.

2. U.S. EPA, 1989, *Interim Guidance on Administrative Records for Selection of CERCLA Response Actions.*

3. U.S. EPA, 1989, *Guidance on Preparing Supefund Decision Documents: me Proposed Plan, me Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment,* OSWER Directive 9355.3-02.

4. U.S. EPA, 1989, *A Guide to Developing Supefund Records of Decision,* OSWER Directive 9355 .3-02FS-1.

5. U.S. EPA, 1990, *Superfund Removal Procedures: Action Memoratium Guidance.*

6. U.S. EPA, 1992, *Superfund Removal Procedures –Public Participation Guidance for On-Scene Coordinators: Community Relations and the Administrative Record*, OSWER Directive 9360.3-05.

7. DOE, December 1993, *Remedial Investigation/Feasibility Study (W/FS) Process, Elements, and Techniques Guidance, DOE/EH-94007658.*

8. DOE, September 1994, *CERCU Removal* **Actions, DOE/EH-0435.**

9. **40** CFR 300, March 8, 1990, *National Oil and Hazardous Substances Pollution Contingent Plan,* Federal Register, Vol. 55, No. 46 Rules and Regulations.

10. U.S. DOE, U.S. EPA, May 25, 1995, *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), p. 4.*

Submodule 4.6.1 Non-Time-Critical Removal Actions

Non-Time-Critical Removal Actions and Early Remedial Actions

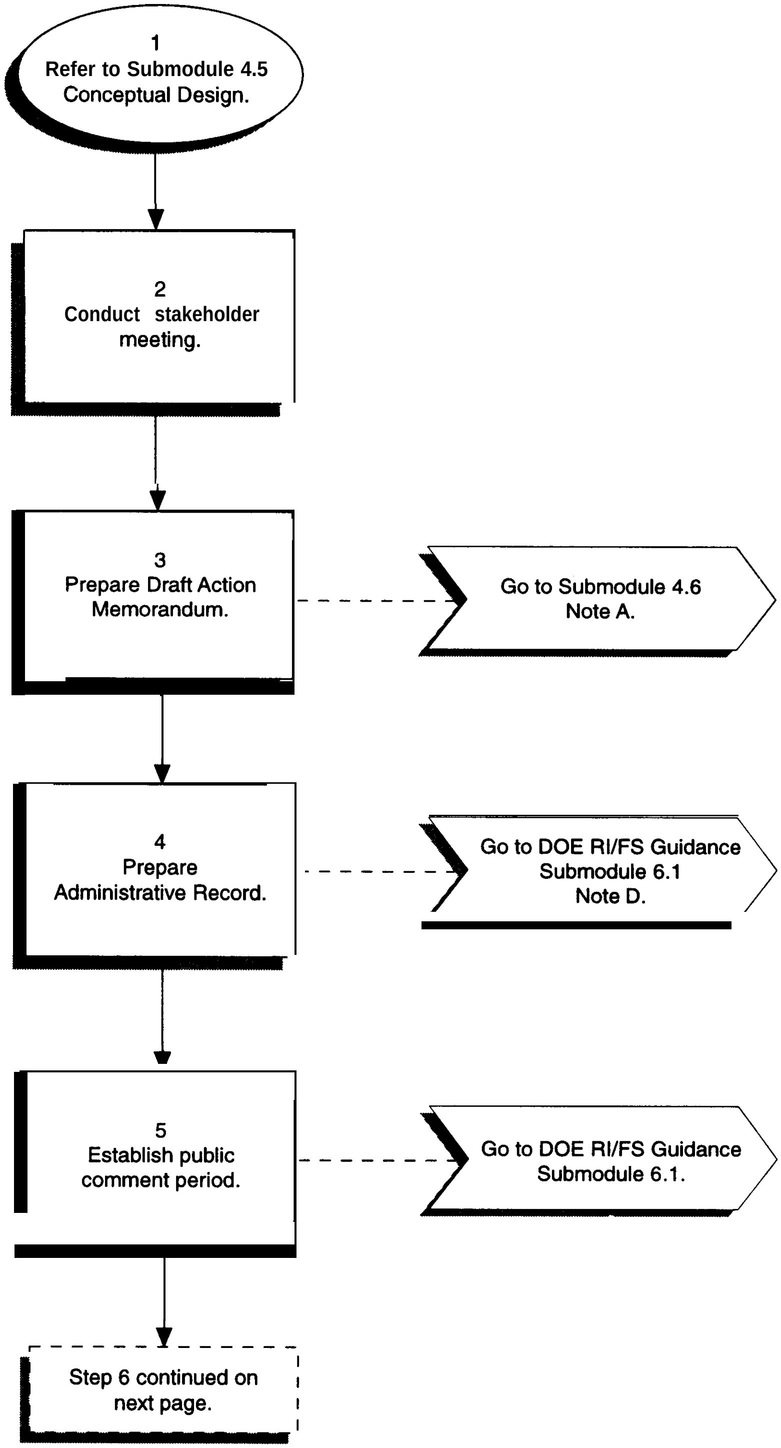
- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- 4.4 EE/CA or FFS
- 4.5 Conceptual Design
- **4.6 Remedy Selection and Documentation**

4.6.1 Non-Time-Critical Removal Actions

- Stakeholder Meeting
- Preparation of Draft Action Memorandum
- Preparation of Administrative Record
- Public Comment Period
- Preparation of Final Action Memorandum
- Update Administrative Record and Provide Public Access
- Publication of Action Memorandum
- Post-Decision Document Changes

This page intentionally left blank.

Submodule 4.6.1 Non-Time-Critical Removal Actions



NOTE:
Consult DOE's *CERCLA Removal Actions* (1994) for additional detail on procedural requirements for issuing action memoranda.

Submodule 4.6.1 Non-Time-Critical Removal Actions

Step 1. Refer to Submodule 4.5, Conceptual Design.

Step 2. **Conduct stakeholder meeting.** In practice, the extended project team should be sufficiently integrated into the early action process so that separate, distinct meetings are not necessary. However, at a minimum, a meeting of the extended project team is recommended once any LFI is complete, the EE/CA is substantially complete, and the remedy selection process is ready to proceed. The purposes are (1) to review and approve the results of the decision and design support phase; (2) to reach consensus on the details of the response action to be proposed for public consideration; (3) to reach consensus on the schedule and other details of the public participation process to be followed in reaching the final decision on the removal action; and (4) to resolve any issues regarding the draft Action Memorandum that will be developed by DOE and presented to the public. Following this meeting, DOE should prepare the draft Action Memorandum and begin the public participation process.

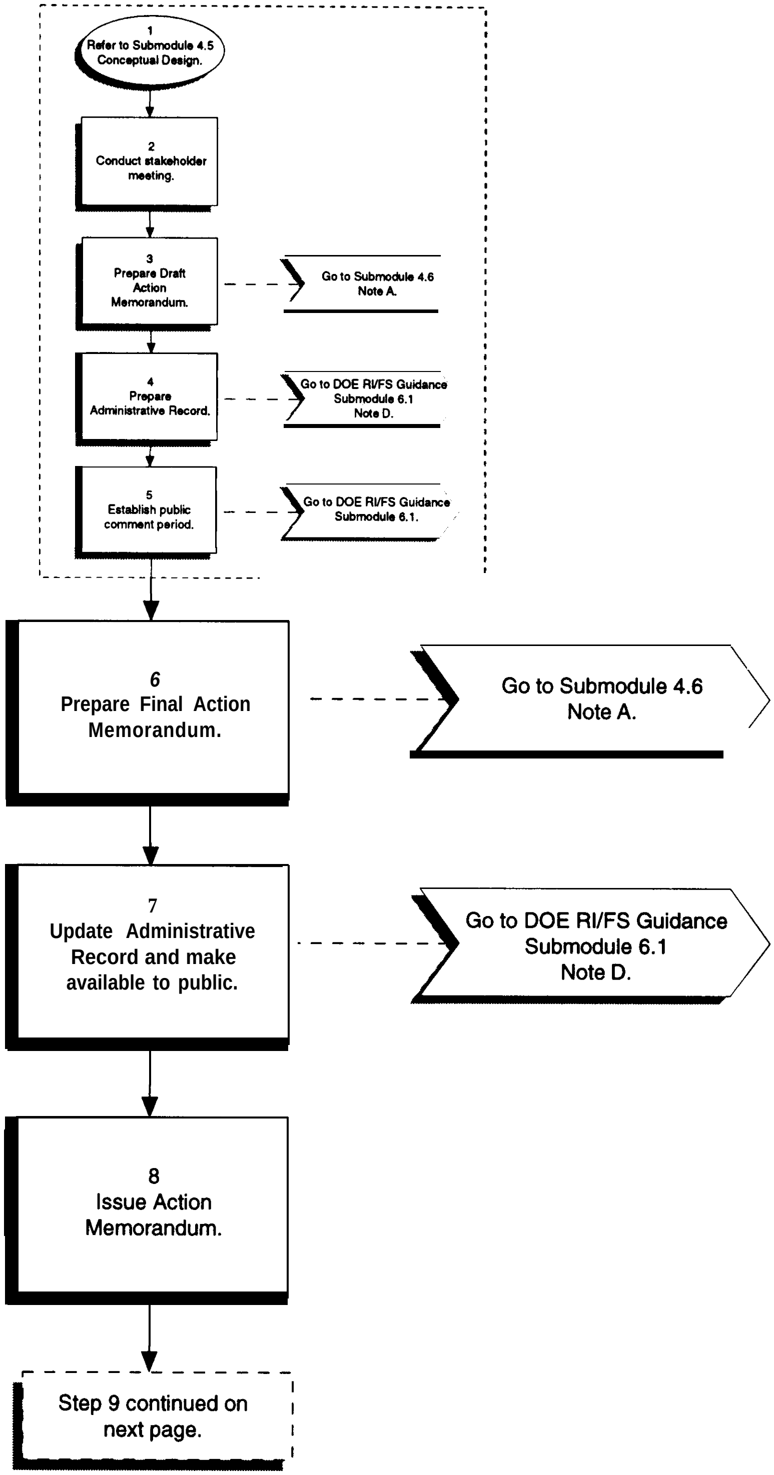
Step 3. **Prepare Draft Action Memorandum.** A draft of the Action Memorandum is prepared for release with the EE/CA. This is not a required step under EPA guidance, but is recommended because there is adequate time for fill public participation in a non-time-critical removal action. The purposes are the same as for a Proposed Plan released with an FFS – to describe to the public the envisioned response action (i.e., a non-time-critical removal), to present the basis for selecting the response action, and to solicit public comment.

The draft Action Memorandum should be prepared according to the format and other requirements that will be followed for the final Action Memorandum, specifically the requirements in EPA's Action Memorandum Guidance (EPA, 1990). Submodule 4.6, Note A presents the specified outline for action memoranda. EPA (1990) provides detailed instructions on preparing action memoranda. [Note that some of the guidance in EPA (1990) relates only to EPA-lead removals that involve trust fund monies or an administrative order, and does not need to be followed for a removal at a DOE site.]

Step 4. **Prepare Administrative Record.** Development of an Administrative Record for a removal action is required by CERCLA Section 113(k) and the NCP. The Administrative Record is a compilation of documents upon which the remedy selection is based. Specific guidance on the preparation and contents of the Administrative Record is given in *Interim Guidance on Administrative Records for Selection of CERCLA Response Actions* (EPA, 1989), in Subpart I of the NCP, and in Chapter 6 of the EPA community relations handbook (EPA, 1988). The Administrative Record should consist of documents that DOE considered or relied on to select the response action and documents that demonstrate the public's opportunity to participate in selection of the response action. DOE's RI/FS guidance, Submodule 6.1, Note D provides a list of documents typically included in an Administrative Record.

Step 5. **Establish public comment period.** **The** DOE project manager or designee must make arrangements for a public meeting if one is requested by any stakeholder. me public meeting is arranged for and held by DOE. The public review period is a minimum of 30 days (NCP requirement), but a longer period may be appropriate for some actions.

Submodule 4.6.1 Non-Time-Critical Removal Actions (cont.)



Additional information on public participation responsibilities is given in *Supefund Removal Procedures – Public Participation Guidance for On-Scene Coordinators: Community Relations and the Administrative Record* (EPA, **1992)** and DOE's RI/FS guidance, Submodule 6.1.

Step 6. **Prepare Final Action Memorandum.** The purposes of the action memorandum are similar to those of a ROD. One primary difference is the level of risk determination can be more qualitative than that required for an early action or interim remedial action.

CERCLA statutory limits on removal actions (i.e., 1 year and $2 million) do not apply to DOE removal actions because they are not fund financed (DOE/EPA, 1995). Facility-specific Federal Facilities Agreements (FFAs) should be examined to assess whether the limitations apply.

Detailed information for preparing Action Memoranda and a specific outline are provided in *Supefund Removal Procedures: Action Memorandum Guidance* (EPA, 1990). The outline is provided in Submodule 4.6, Note A.

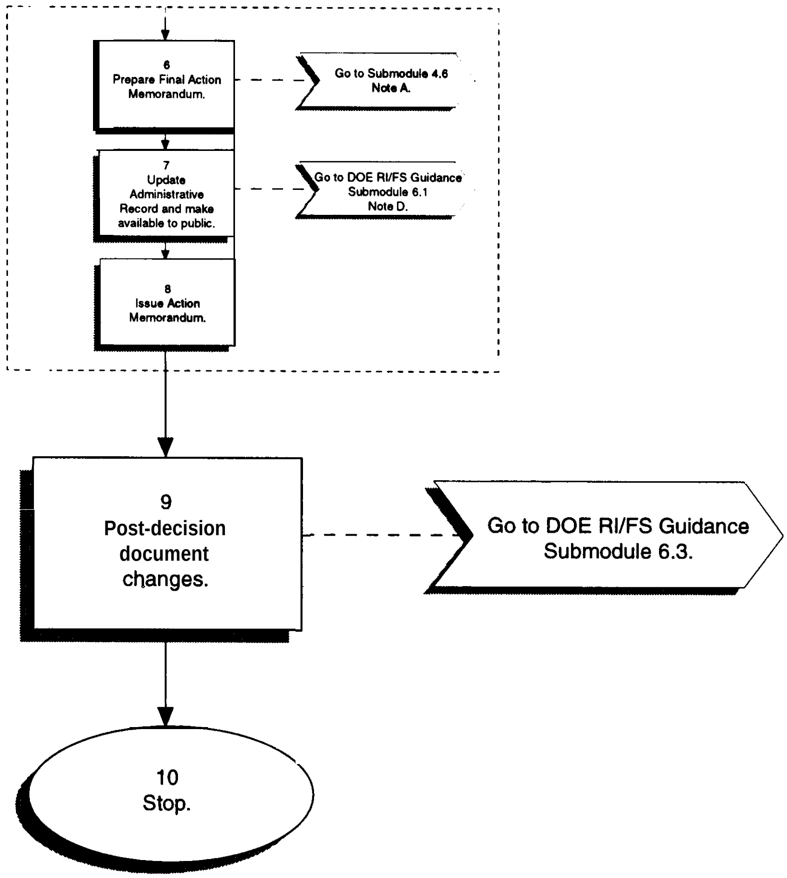
Step 7. Update Administrative Record and make available to public. The Administrative Record was initiated during scoping and kept current throughout the process. It was brought to a high level of completeness and organization upon release of the EE/CA and draft Action Memorandum. At this point, addition of public comments, transcripts of public meetings, and the final Action Memorandum should be sufficient to ensure that the Administrative Record is complete. This is necessary in the event of any challenges to the selected remedy. Any court review would be based primarily on the Administrative Record. Additional detail on requirements of the Administrative Record is presented in DOE's RI/FS guidance, Submodule 6.1, Note D.

Step 8. **Issue Action Memorandum.** A newspaper release is required to denote the signing of an Action Memorandum. Guidance on the publication of an Action Memorandum is provided in *Supefund Removal Procedures – Public Participation Guidance for On-Scene Coordinators: Community Relations and the Administrative Record* (EPA, 1992).

EPA guidance does not specify the contents of the notice for an Action Memorandum; however, the required elements for a ROD notice are useful guidelines:

- Site name and notice of availability of the [Action Memorandum]
- Date on which the [Action Memorandum] was signed
- Brief summary of the major elements of the selected remedy
- Details about the hours of availability of the Administrative Record and/or the information repository
- Name and telephone number(s) of individual(s) to contact for further information

Submodule 4.6.1 Non-Time-Critical Removal Actions (cont.)



Step 9. **Post-decision document changes.** Changes in the approach to the removal action may occur after the Action Memorandum is signed. Such changes may, for example, occur as a result of the final design effort. If such changes result in a fundamental difference in how the early action is to be carried out [e.g., changing the technology being used (in situ biotreatment replaced by low temperature ex situ thermal resorption)], the public and the extended project team must have an opportunity to comment before the action is implemented.

The Action Memorandum should be written to allow the maximum flexibility in establishing the final approach to remediation (see Step 6). This minimizes the potential for changes that require public involvement.

DOE's RI/FS guidance, Submodule 6.3 addresses post-ROD changes for final remedial actions. The formality required in dealing with changes for final actions is less appropriate for early actions. Because a removal action is not a final remedial action, more flexibility is allowed in dealing with post-Action Memorandum changes. Any early actions can be summarized and endorsed in the final ROD. Public notice, with some opportunity to comment on truly fundamental changes, is required. Reissuing an Action Memorandum should not be required unless the original decision document was too narrowly constructed.

Step 10. Stop.

Submodule 4.6.2 Early Remedial Actions

Non-Time-Critical Removal Actions and Early Remedial Actions

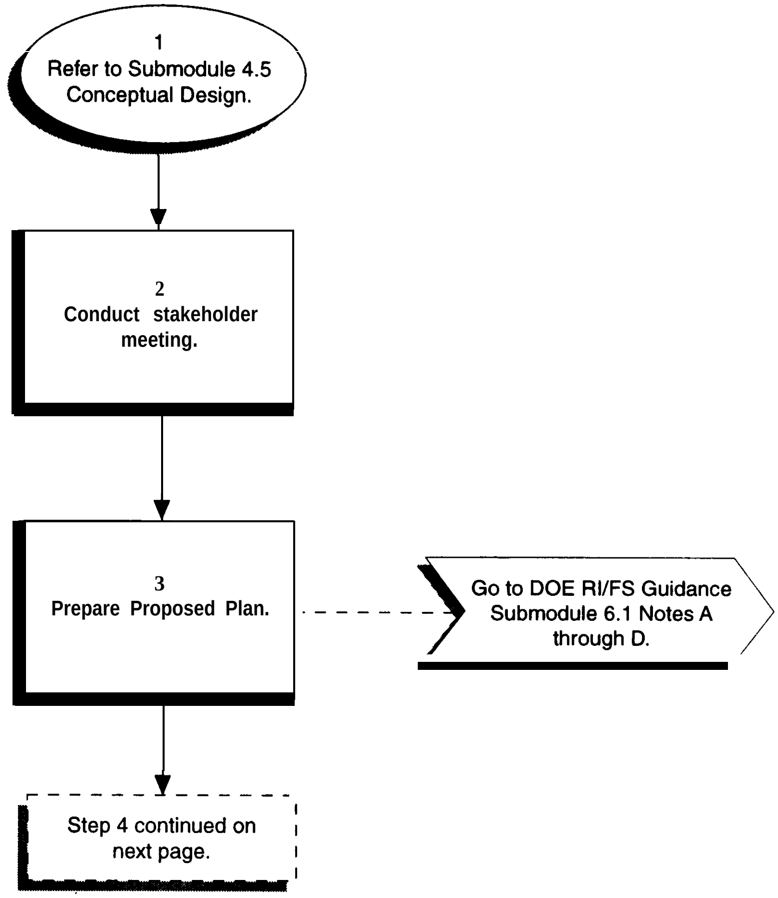
- 4.1 Scoping
- 4.2 Limited Field Investigations
- 4.3 Preconceptual Design
- 4.4 EE/CA or FFS
- 4.5 Conceptual Design
- **4.6 Remedy Selection and Documentation**

4.6.2 Early Remedial Actions

- Stakeholder Meeting
- Preparation of Proposed Plan
- Preparation of Administrative Record
- Public Comment Period
- Preparation and Finalization of ROD
- Update Administrative Record and Provide Public Access
- Publication of ROD
- Post-Decison Document Changes

This page intentionally
left blank.

Submodule 4.6.2 Early Remedial Actions



Submodule 4.6.2 Early Remedial Actions

Step 1. Refer to Submodule 4.5, Conceptual Design.

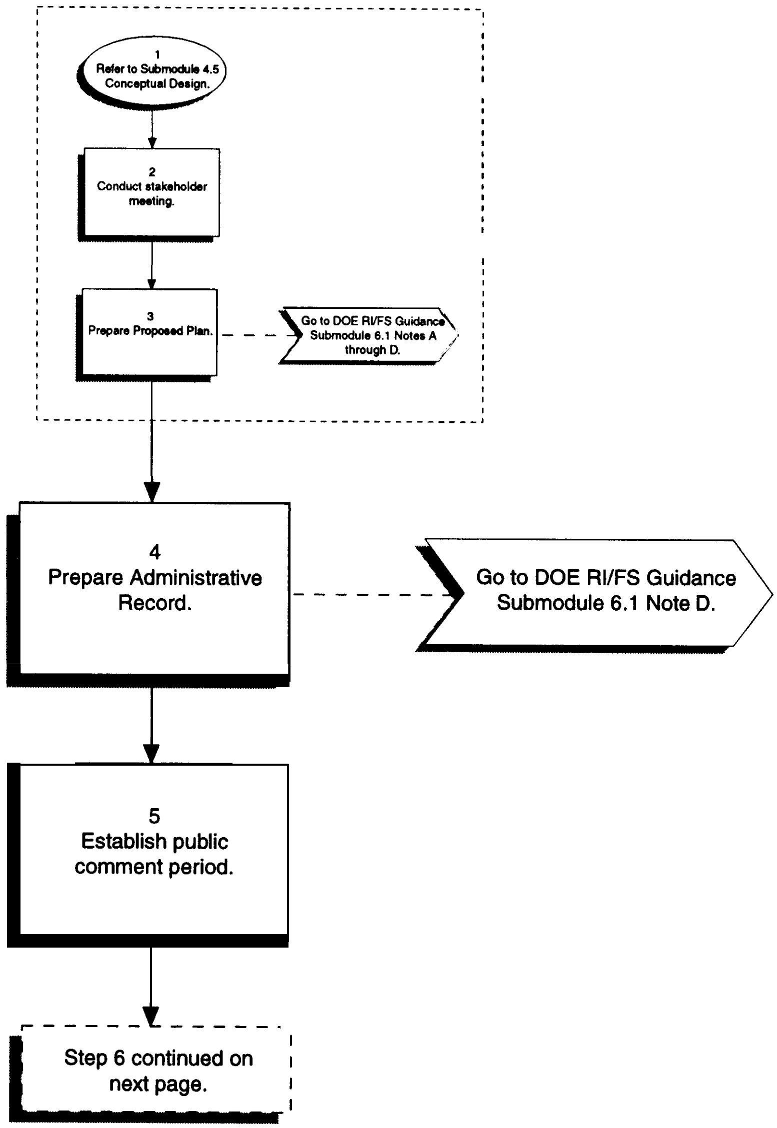
Step 2. **Conduct stakeholder meeting.** A meeting of the extended project team is recommended once the LFI is complete, the FFS is substantially complete, and the remedy selection process is ready to proceed. The purposes are (1) to review and approve the results of the decision and design support phase; (2) to reach consensus on the details of the response action to be proposed for public consideration; (3) to reach consensus on the schedule and other details of the public participation process to be followed in reaching the final decision on the early action; and (4) to resolve any issues regarding the Proposed Plan to be developed by DOE and presented to the public. Following this meeting, DOE should prepare the Proposed Plan and begin the public participation process.

Step 3. **Prepare Proposed Plan.** DOE is responsible for drafting the Proposed Plan for an early or interim remedial action. DOE's RI/FS guidance, Submodule 6.1, Notes A and B provide an outline, suggested language, and an example Proposed Plan. The Proposed Plan should be quite brief (e.g., 10 to 12 pages). While several elements are required, even the most complex issues (e.g., the nature and results of the risk assessment) can be handled very briefly (e.g., 2 to 4 pages) by presenting only the relevant results of the LFI and FFS. Stakeholders who desire additional detail can consult the LFI and FFS reports or the Administrative Record. The Proposed Plan can be developed in a fact sheet format or in a slightly expanded format that provides additional details.

Certain elements must be included in the Proposed Plan. The example outline and the example Proposed Plan provided in the Notes listed above (DOE's RI/FS guidance) should be consulted for a complete listing. Several of the specific requirements are:

- A specific "Finding of Risk" paragraph, concluding that remedial action is necessary, must be included in any Proposed Plan.
- The alternative(s) must be presented in accordance with the two threshold criteria (overall protection of human health and the environment, and compliance with ARARs) and the five balancing criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost). If more than one alternative exists, the presentation focuses on the important differences among the alternatives, emphasizing the five balancing criteria rather than presenting an exhaustive summary of the detailed analysis in the FFS.
- The preferred alternative represents the best approach as based on the five balancing criteria.
- The preferred alternative should meet the CERCLA expectations for protectiveness, ARARs compliance, cost-effectiveness, permanence, and use of treatment to the maximum extent practicable. If one or more of the CERCLA requirements will not be met (e.g., the preference for use of treatment-based alternatives), the Proposed Plan needs to be explicit on that point and explain briefly why the expectation cannot be met.

Submodule 4.6.2 Early Remedial Actions (cont.)



- Public participation information should consist of the "who, what, when, and how" that is needed to enable public comment on the preferred alternative and the supporting data.

- Specific statements of the EPA and State regulatory agency positions should include the preferred alternative and other aspects of the Proposed Plan. The State's position on the preferred alternative constitutes the basis for evaluation of the NCP'S eighth criterion, "State Acceptance."

In addition to these issues, the Proposed Plan must provide a perspective on the OU being addressed, its relationship to any other OUs at the site, and the relationship of the early or interim remediation to overall site cleanup. Finally, certain regulations require specific opportunity for public comment. For examples, land disposal restriction (LDR) treatability variances under 40 CFR 268.44 and Corrective Action Management Units (CAMUs) under 40 CFR 264.552 are two ARARs for which specific comments must be elicited. If any of these regulatory options will be used, the Proposed Plan specifically solicits public comments on use of the option.

EPA/State concurrence must be obtained on the Proposed Plan. The DOE project manager or designee must arrange for review and comment opportunities for the regulatory agencies during preparation of the Proposed Plan. Given the high level of cooperation and shared viewpoint typically necessary to move an early action forward to the decision point, EPA and the State may concur in and sign the Proposed Plan, thus making it a joint document.

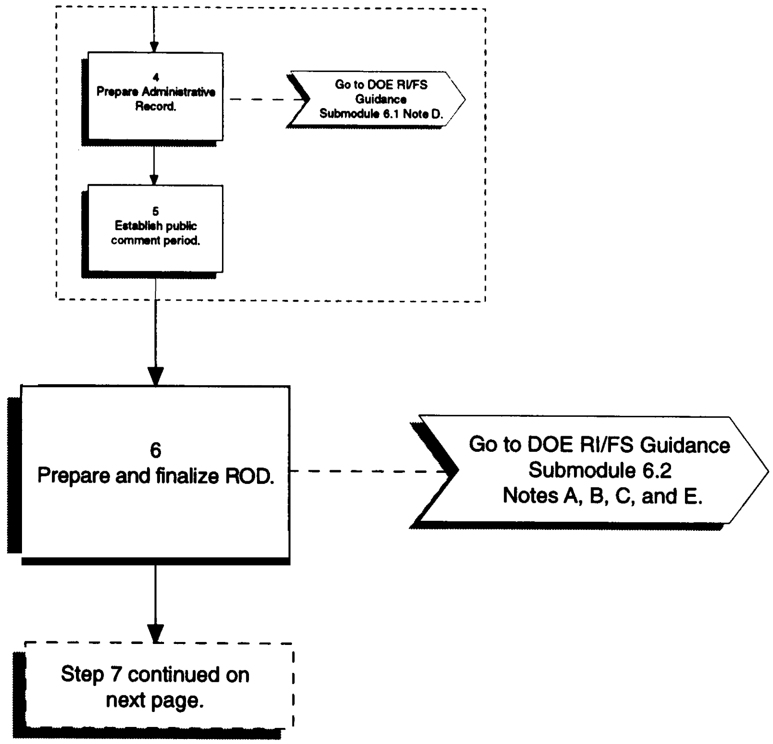
(See DOE's RI/FS guidance Submodule 6.1, Notes A through D.)

Step 4. Prepare Administrative Record. The development of an Administrative Record for a remedial action is required by CERCLA Section 113(k) and the NCP. The Administrative Record is a compilation of documents upon which the remedy selection is based that are made available to the public during the comment period. Specific guidance on the preparation and contents of the Administrative Record is given in *Interim Guidance on Administrative Records for Selection of CERCLA Response Actions* (EPA, 1989), in Subpart I of the NCP, and in Chapter 6 of the EPA community relations handbook (EPA, 1988). The Administrative Record should consist of documents that DOE considered or relied on to select the response action and documents that demonstrate the public's opportunity to participate in selection of the response action. DOE's RI/FS guidance, Submodule 6.1, Note D provides a list of documents typically included in an Administrative Record.

Step 5. Establish public comment period. Publish the proposed plan and facilitate public input. The Proposed Plan must be made available to anyone who requests a copy. A newspaper notice of the availability of the Proposed Plan that includes the time and place of a public meeting is required (see DOE's RI/FS guidance, Submodule 6.1, Note D). The seven required sections of the newspaper notice are:

- Site name and location
- Date and location of a public meeting
- Identification of lead and support agencies
- Alternative(s) evaluated in the detailed analysis
- Identification of the preferred alternative

Submodule 4.6.2 Early Remedial Actions (cont.)



- Request for public comments
- Public participation information

The DOE project manager or designee must make arrangements for a public meeting if one is requested by any stakeholder. The public meeting is arranged for and held by DOE. The public review period is a minimum of 30 days (NCP requirement), but a longer period may be appropriate for some actions. Additional information on public participation responsibilities is given in *Community Relations in Superfund: A Handbook*, Interim Guidance (EPA, 1988).

Public input on the Proposed Plan constitutes the basis for evaluation of the NCP'S ninth criterion, "Community Acceptance. "

Step 6. **Prepare and finalize ROD.** (More detailed information on preparing and finalizing RODS is given in DOE's RI/FS guidance, Submodule 6.2). A ROD is the formal decision document for an early or interim remedial action. A ROD has four main roles: (1) to serve a legal function by documenting that the remedy selection process was conducted in accordance with the requirements of CERCLA and the NCP; (2) to provide the public with a consolidated source of history, characteristics, and risks posed by the conditions at the site, as well as a summary of the cleanup alternatives, their evaluation, and the rationale behind the selected remedy; (3) to include the responsiveness summary to public comments; and (4) to outline the engineering components and remediation goals of the selected remedy. An example ROD outline is presented in DOE's RI/FS guidance, Submodule 6.2, Note A.

The ROD is required to consist of three basic elements:

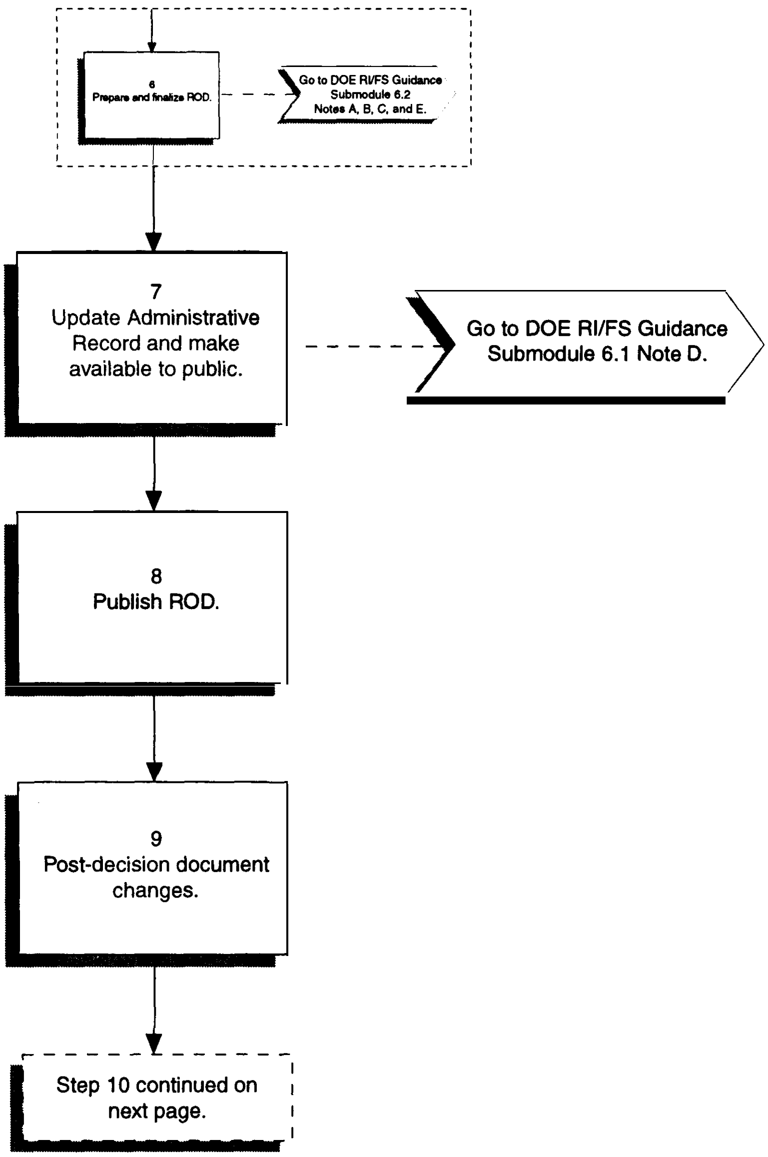
- A Declaration that functions as an abstract of the key information contained in the ROD and is the section of the ROD signed by the EPA Regional Administrator or Assistant Administrator and the authorized DOE Field Office manager. DOE's RI/FS guidance, Submodule 6.2, Note B provides an example of suggested wording for the Declaration.

- A Decision Sumrnary, which provides formal acceptance of the RI/FS approach and results, including the conceptual site model, as a basis for remedy selection, risk assessment, ARARs evaluation, and alternatives development and evaluation. The Decision Summary also identifies the selected remedy and explains how the remedy fulfills the statutory requirements and CERCLA expectations. DOE's RI/FS guidance, Submodule 6.2, Note B also provides an example of suggested wording for the Decision Summary.

- A Responsiveness Surnmary that addresses the public comments received on the Proposed Plan, RI/FS report, and other information in the Administrative Record. This can be prepared as a separate document. See DOE's RI/FS guidance, Submodule 6.2, Note C for additional information.

An example ROD for an interim action (for the Weldon Spring Site) is provided in DOE's RI/FS guidance, Submodule 6.2, Note E. This particular example provides a good

Submodule 4.6.2 Early Remedial Actions (cont.)



understanding of the components of the ROD and shows how a ROD for an interim action can be somewhat streamlined compared with a final action.

Because EPA will have to sign the ROD, EPA concurrence is essential. The FFA may specify that the State must also sign the ROD. A goal of 15 working days for support agency review is suggested in the EPA ROD guidance. Schedules in specific FFAs may require different review times.

Step 7. Update Administrative Record and make available to public. The Administrative Record was initiated during Scoping and kept current throughout the process. It was brought to a high level of completeness and organization upon release of the FFS and Proposed Plan. At this point, addition of public comments, transcripts of public meetings, and the final ROD should be sufficient to ensure that the Administrative Record is complete. This is necessary in the event of any challenges to the selected remedy. Any court review would be based primarily on the Administrative Record. Additional detail on requirements of the Administrative Record is in DOE's RI/FS guidance, Submodule 6.1, Note D.

Step 8. **Publish ROD.** A newspaper release is required to denote the signing of a ROD. The five required elements of a ROD notice are:

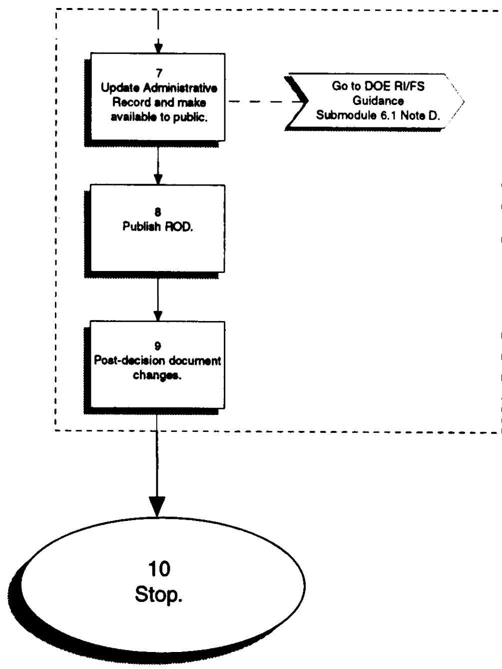
- Site name and notice of availability of the ROD
- Date on which the ROD was signed
- Brief summary of the major elements of the selected remedy
- Details about the hours of availability of the Administrative Record and/or the information repository
- Name and telephone number(s) of individual(s) to contact for further information

Step 9. **Post-decision document changes.** Changes in the approach to the early action may occur after the ROD is signed. Such changes may, for example, occur as a result of the final design effort. If such changes result in a fundamental difference in how the early action is to be carried out [e.g., changing the technology being used (in situ biotreatment replaced by low temperature ex situ thermal resorption)], the public and the extended project team must have an opportunity to comment on any change before the ROD is signed, or they must be given an opportunity for comment before the action is implemented.

The ROD should be written to allow the maximum flexibility in establishing the final approach to remediation (see Steps 7 and 8). This minimizes the potential for changes that require public involvement.

DOE's RI/FS guidance, Submodule 6.3, addresses post-ROD changes for final actions. The formality required in dealing with changes after a final ROD is signed is less appropriate for early actions. Because the early actions addressed in this module are not final actions, more flexibility is allowed in dealing with post-ROD changes –changes to any early actions can be summarized and endorsed in the final ROD. Public notice, with

Submodule 4.6.2 Early Remedial Actions (cont.)



some opportunity to comment on truly fundamental changes, is required. Reopening the ROD should not be required unless the decision document was too narrowly constructed.

Step 10. Stop.

This page intentionally left blank.

Note A. **EPA-Specified[1] Outline for an Action Memorandum.**

I. Purpose

II. Site conditions and background

- A. Site description
  1. Removal site evaluation
  2. Physical, location
  3. Site characteristics
  4. Release or threatened release into the environment of a hazardous substance, pollutant, or contaminant
  5. NPL status
  6. Maps, pictures, and other graphics representation
- B. Other actions
  1. Previous actions
  2. Current actions
  3. Consistency with final actions
- C. State and local authority roles
  1. State and local actions to date
  2. Potential for continued state/local response

III. Threats to public health or welfare or the environment, and statutory and regulatory authorities

- A. Threat to public health or welfare
- B. Threats to the environment

IV. Determination of endangerment

V. Proposed actions and estimated costs

- A. Proposed actions
  1. Proposed action description
  2. Contribution to remedial performance
  3. Description of alternative technologies
  4. EE/CA
  5. ARARs
  6. Project schedule
- B. Estimated costs

VI. Expected change in the situation if action is delayed or not taken

[1]EPA, 1990.

This page intentionally left blank.