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Guidance on Expediting Remedial Design and Remedial Action

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Guidance on Expediting Remedial Design and Remedial Action

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, DC 20460

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ACRONYMS USED IN THIS GUIDANCE

ARCS	-	Alternative Remedial Contracting Strategy
BAFO	-	Best and Final Offer
BUREC	-	Bureau of Reclamation
CA	-	Cooperative Agreement
CBD	-	Commerce Business Daily
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	-	Code of Federal Regulations
CO	-	Contracting Officer
CPM	-	Critical Path Method
DBA	-	Davis-Bacon Act
DOL	-	Department of Labor
EPA	-	Environmental Protection Agency
ERCS	-	Emergency Response Cleanup Services
GVS	-	Greatest Value Score
IFB	-	Invitation for Bids
OSWER	-	Office of Solid Waste and Emergency Response
PDTS	-	Predesign Technical Summary
PRP	-	Potentially Responsible Party
RA	-	Remedial Action
RD	-	Remedial Design
RFP	-	Request for Proposals
RFTP	-	Request for Technical Proposals
RI/FS	-	Remedial Investigation/Feasibility Study
RMS	-	Remedial Management Strategy
ROD	-	Record of Decision
RPM	-	Remedial Project Manager
SSC	-	State Superfund Contract
TSSB	-	Two Step Sealed Bidding
USACE	-	U. S. Army Corps of Engineers
VE	-	Value Engineering

CHAPTER 1 INTRODUCTION

1.1 PURPOSE OF THIS GUIDANCE

This guidance examines ways to expedite remedial design and remedial action (RD/RA) so that cleanup activities can be completed more quickly. It is intended for use by remedial project managers, remedial design contractors, and others involved in planning remediation activities. It should be used as a means to evaluate whether a project is suited for expediting and to determine the methods that could be used. The guidance is intended as a management approach, not a "cookbook," for planning projects. Each project is unique, and the approach should be tailored accordingly.

In "A Management Review of the Superfund Program," or the Ninety Day Study, Administrator Reilly emphasized a bias for action at Superfund sites. The National Contingency Plan also emphasizes a bias for actions which eliminate, reduce, or control site hazards as early as possible. This guidance emphasizes the same bias--expediting cleanups. It is a complementary guidance to OSWER Directive 9355.3-06, "RI/FS Improvements, Streamlining Recommendations."

Application of the concepts in this guidance should not significantly increase the remedial project managers' workloads. It may, however, increase the remedial design and remedial action contractors' workloads to incorporate and coordinate the approaches.

1.2 DEFINITIONS OF TERMS

The following terms are used in this guidance:

Project - A remedy described in the Record of Decision that must be accomplished. It may be the remedy for an entire site or an operable unit.

Remedial work element - A portion of a project that has been broken out through phasing. This will be a separate contract package for procurement of remedial design work elements as well as remedial action work elements.

Steps - The individual pieces or activities required to complete each remedial work element. The steps are manipulated to fast-track the element.

1.3 OVERVIEW OF THIS GUIDANCE

Chapter 2 discusses the Remedial Management Strategy, or RMS, which is a planning document for the remedial design and remedial action. Careful RD/RA planning is critical to successful execution of a project. The RMS, which is typically prepared by the Remedial Project Manager, is a systematic consideration of the components of remedial design and remedial action. The resultant document is a road map for the design of a project.

As part of the RMS, the RPM, in conjunction with the designer, should consider phasing, which is covered in Chapter 3. Through phasing, a project is divided into separate remedial work elements that can be implemented on different schedules. The chapter discusses criteria for phasing and management issues that should be considered.

Once phasing is determined, Chapter 4 discusses how to fast-track the individual remedial work element. Steps in the RD process can be eliminated or rearranged to accelerate the overall schedule. Techniques to analyze a project for fast-tracking are discussed in detail as well as the suggested approach.

Chapter 5 deals with types of contracts and specifications. The two primary contract types are fixed-price and cost-reimbursement, with variations within these types. Specifications can be performance, design, or brand name or equal. The chapter describes these contract and specification types and considerations for selecting the appropriate type. Also discussed is the distinction between construction and service contracts.

Procurement strategies are discussed in Chapter 6. Different types of work are suited for distinct solicitations. Those described in Chapter 6 are sealed bidding, negotiated procurement, and two step sealed bidding. The process for each solicitation as well as advantages, disadvantages, and schedule impacts are described.

Finally, Chapter 7 describes how to put these techniques and concepts together to expedite RD/RA. It includes flow charts on phasing, fast-tracking, and procurement with explanations of the decision process.

1.4 APPLICABILITY OF THIS GUIDANCE

Although the techniques described in the guidance are directed toward Federal fund-lead projects, the concepts are also applicable to State- and Potentially Responsible Party-lead projects. Some projects are more amenable to acceleration than others. The acceleration techniques covered work best for smaller projects, but they can apply to all projects.

1.5 AREAS THE GUIDANCE DOES NOT ADDRESS

The use of an innovative technology is an important consideration in planning RD/RA. The topic, however, is not specifically addressed in this document but will be the subject of a separate guidance. Innovative technology can, however, be incorporated into the concepts discussed.

CHAPTER 2 REMEDIAL MANAGEMENT STRATEGY

2.1 INTRODUCTION

The Remedial Management Strategy (RMS) is a planning tool for expediting the remedial design (RD) and remedial action (RA). It contains an analysis of the major management considerations required to achieve the goals of the ROD in a timely manner. Preparation of the strategy by the lead agency RPM is essential for the smooth progression of a project through RD and RA.

2.2 PRE-DESIGN PLANNING

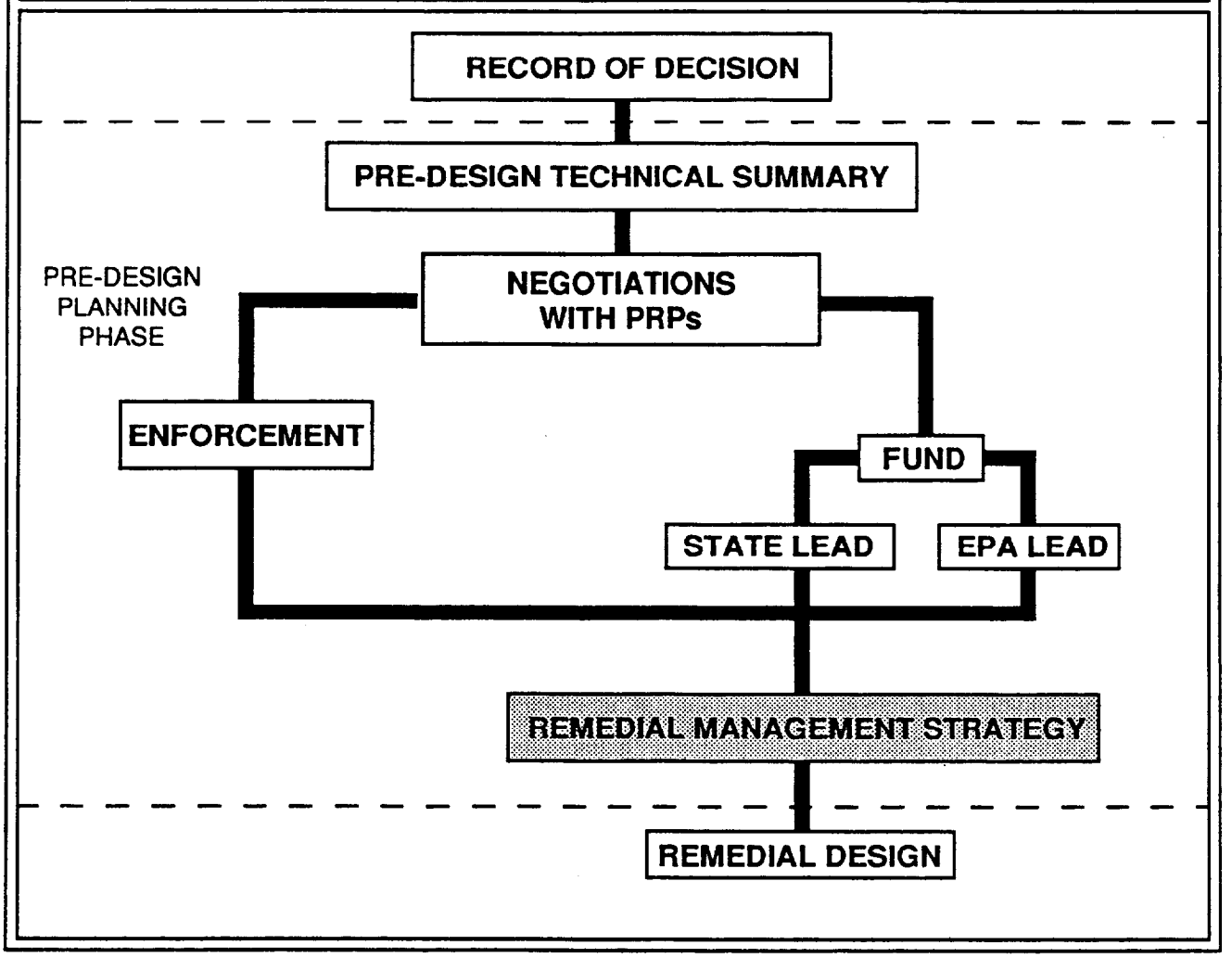
Pre-design planning, as shown in Figure 2-1, moves a project from the Record of Decision (ROD) into the remedial design. During this phase, a Pre-design Technical Summary (PDTS) is developed prior to negotiations with the PRPs to express EPA's technical requirements in design terms. If the response action will be financed by the Fund, a decision must be made as to whether EPA or the State will be the lead agency.

Once the lead agency has been determined, an RMS should be prepared to establish a strategy for managing the remedial design and remedial action. The RMS is a working document for internal use. It is not intended to be cumbersome or difficult to prepare. The RMS length and complexity should be tailored to the nature of the project and kept as brief as possible. The lead agency RPM, with technical assistance from various resources, such as contractors and other agencies, should develop an RMS using the following general guidelines:

- Identify project goals in the ROD.
- Evaluate the project site, including geography, geology, climate, access, local population, utilities, evacuation routes, and proximity of hospital and fire department facilities.
- Review the remedial technology to determine the need for new or innovative equipment, items requiring long lead-time for procurement, operable units, and specialty contractor requirements.
- Develop schedules and budget projections.

FIGURE 2-1

PRE-DESIGN PLANNING PHASE



- Evaluate funding requirements (such as mixed or incremental funding.

- Review health and safety requirements.

- Develop a Remedial Management Strategy that is consistent with the project's goals and constraints.

Section 2.4 explains the RMS in more detail.

2.3 EXPEDITING REMEDIAL DESIGN AND REMEDIAL ACTION

Careful project planning prior to design can yield great dividends in expediting both the RD and RA:

- The selected approach should be coordinated with the projected funding and schedule requirements.

- Early selection of contract options saves both time and money.

- A comprehensive Remedial Management Strategy developed after completion of the ROD will result in a smoother transition to RD and RA by identifying roles and responsibilities.

- An early review of the management risks associated with the project can prevent designer and RA contractor claims and provide for strategies to resolve disputes during the project.

2.4 MANAGEMENT CONSIDERATIONS

Because the significance of individual considerations will vary from project to project, part of the RMS development involves analyzing the relative importance of each of the following factors on the project goals:

- Contracting Party. EPA's RPM must determine, based on EPA policy guidelines, which organization will contract for RD (State, EPA, USACE or BUREC) and the RA (State, ARCS, USACE or BUREC). Once the selection is made, the lead agency RPM should utilize the expertise of contractors and other agencies to help develop the RMS.

- Funding. Funding considerations are of particular concern in the development of a management strategy, particularly if the project is a multi-year effort. The strategy must address the availability of funds including the State cost share and obligations during future years. Interagency funding agreements should be confirmed early to prevent possible delays. The RMS should include budget planning projections based on the proposed project schedule and contract packages.

- Resources. An analysis must be made to determine the special technical qualifications for the work, the workload and availability of the resources required, and the level of interest of qualified contractors.

- Site access. Access to the site is crucial to the implementation of a remedy. A plan should be developed to resolve any site access problems and obtain the necessary rights-of-way.

- Regulations and permits. The RMS should also include, to the extent possible, an evaluation of the logistical elements involving agencies that have jurisdiction over the site such as:

  Federal agencies
  Local planning commissions
  Zoning authorities
  County building departments
  Local water and waste water authorities
  Public utilities (gas, electric, telephone)
  State industrial safety divisions
  Local law enforcement agencies
  Local fire departments
  Traffic and highway authorities
  State environmental offices

- Health and safety. The management of the health and safety program will have an impact on the successful completion of the project. The health and safety program and the protective gear requirements will affect the productivity of the RA personnel and influence the schedule of the project. An estimate of these impacts should be made to provide a clearer picture of the overall duration of the project.

- Phasing and fast-tracking. One of the first items to be evaluated in an RMS is the potential for phasing or

fast-tracking the project. These approaches will allow the RA to be implemented sooner than if all of the steps were treated as a single design and remedial action. Chapters 3 and 4 explain phasing and fast-tracking in more detail.

- Equipment. The ROD may specify a process or remedy that requires special or proprietary equipment, particularly if a new or innovative technology is recommended. In these instances, it is important to evaluate the delivery schedule for such equipment. This would include the time necessary to review shop drawings, do performance testing, and for shipping requirements. If these processes are anticipated to take a long time, consideration should be given to purchasing the equipment under a separate contract to ensure its timely delivery to the site.

- Weather. When considering weather, it is necessary to evaluate not only the time of year when the work will occur but also the geographic location. Extreme temperatures or high winds may make execution of a remedial action difficult.

- Design reviews. The importance of reviews cannot be overlooked in planning the management strategy, especially when multiple agencies are involved in the project. EPA, USACE, BUREC, States, PRPs, citizens groups and local agencies may need to provide input at various points along the way. The schedule should reflect the needs of each party so that the project will not be delayed.

- Community Relations. Prior to the initiation of remedial design, the Community Relations Plan may need revision to address any new community concerns anticipated to arise during RD and RA.

- Communications. The best way to communicate to all parties the need for quick response is with a communication matrix, which can be developed as one of the products of the RMS. This matrix shows the procedural flow of information such as submittals, memoranda, documents, and approvals. These communications procedures are agreed to by all parties before the RD begins.

- Disposal issues. Because issues regarding the disposal of materials, such as off or on-site disposal and manifests, can affect the RD/RA process, the RPM should address this element in the RMS. The sooner these issues are addressed, the easier it will be for the designer to prepare the RA documents to reflect the needs of the project.

- Procurement. At this point in the project, it is necessary to consider the RA procurement options that are applicable. Once the number and type of remedial designs and remedial actions have been determined, procurement methods and types of contracts and specifications can be analyzed so that the RPM can formulate a planning approach to procurement. Chapters 5 and 6 cover contracts and procurement strategy in more detail.

- RD and RA Cost and Schedule. The RMS should develop a preliminary schedule for the RD and RA. To assist in the project planning, EPA has developed a series of generic RD schedules that identify tasks, durations, and resources for various types of projects. These standard schedules also account for varying levels of complexity within the project. The schedule developed for the RMS should also identify critical tasks that need to be started early to minimize project delays, give the designer a road map of how the project should be managed, and identify the critical milestones to be met.

2.5 RMS Report

The RMS report should include the following major sections:

- Summary
- Introduction and project description
- Summary of ROD requirements
- Summary of collected information
- Recommended remedial action approach, including a schedule and budget projection for the project
- Description of all issues that remain to be resolved or that require further analysis

The chapters that follow cover in more detail methods to accelerate remedial design and remedial action that could be incorporated into the RMS.

CHAPTER 3 PHASING

3.1 INTRODUCTION

Phasing is the division of a project into meaningful remedial work elements that can be implemented on different schedules resulting in acceleration of the remedial design and remedial action. It allows certain elements of a project to be started ahead of others to lessen the hazards present at the site and to complete simple prerequisite work elements or nonhazardous work elements ahead of more complex and hazardous work elements. Large, complicated projects are separated into smaller, more manageable remedial work elements. Each element can move at its own optimum rate to completion, thereby preparing the site for any further required remediation.

3.2 CRITERIA FOR PHASING

Phasing decisions are based on many criteria, including availability of existing information, type of waste, type of media, technology requirements, and funding availability.

3.2.1 PHASING BY AVAILABILITY OF EXISTING INFORMATION

Assessment of existing information for a site can result in a decision to phase work elements. Where information for part of the site, or one of several media on the site is already sufficient for design to begin, phasing that portion of the work may be appropriate. The decision requires evaluation of available information, such as type, concentration, and physical extent of waste and media affected. For example, if information on one of two media is already available, a work element can be established for the first medium. Also, certain aspects of the design, such as road development or utilities installation, can proceed while data on other aspects of the design is being gathered.

3.2.2 PHASING BY TYPE OF WASTE

Segregation of non-hazardous and hazardous work elements may be a simple criterion for project phasing. The engineering required for the non-hazardous components of a project is frequently more conventional and may lend itself readily to accelerated schedules in RD and RA. Examples are access roads,

fences, and provision of site utilities and buildings. In addition, these types of work elements are frequently prerequisites for more complex elements. It may make sense to begin design and construction of these items as early as possible in the project to ensure that their construction does not impact subsequent work and to avoid construction congestion.

3.2.3 PHASING BY TYPE OF MEDIA INVOLVED

It may be desirable to phase different media into discrete remedial work elements to expedite the start of remedial action. For example, if a soil or sludge has contaminated the groundwater, the RD/RA for the source pollution could be addressed separately from that of the contaminated groundwater plume. Remediation of groundwater may be approached by initially installing a limited barrier well/treatment system and then expanding the treatment scheme as more information is obtained. This allows for quick action based upon limited design information with larger scale actions to follow.

Similarly, wastes which are physically separated, although present in the same medium, can be addressed independently as separate remedial work elements in order to phase the RA process. For example, where it may be necessary to excavate contaminated soil from around and under a number of homes, certain areas where access has been obtained could be remediated before others. Or, where several waste ponds are present at a site, one waste pond may be remediated first to ensure the process works satisfactorily.

3.2.4 PHASING BY TECHNOLOGY REQUIREMENTS

Simple remedies can obviously be implemented much more quickly than those requiring detailed equipment design, fabrication, and specialized operation. Excavation of contaminated soil and back filling with clean material can be started without high technology equipment. Conversely, the design, fabrication, erection, and operation of the on-site system to treat the same soil could extend over a several month period. Consequently, it may be best to phase these activities by setting up two contracts. By separating the overall remedy into remedial work elements based on the type of technology to be implemented, the remedial action can be expedited.

Technology requirements may also vary with the media being remediated, such as air stripping for groundwater and

solidification for soil. It is reasonable to separate and group media components to allow independent development of RD and RA schedules. This allows each element to be implemented as it is finalized without waiting for completion of the design for another element.

3.2.5 PHASING BY FUNDING AVAILABILITY

Remedial action funding considerations may result in phased RD/RA activities. The availability of federal funds to implement a remedy or the willingness of a State to cost share all or part of the remedy has a definite effect on the type, amount and schedule of work which can be performed. The project may have to be phased using the previous criteria in order to be consistent with available funding strategies. An example would be to fund mobilization and construction of an incinerator as phase one, and fund operation of the incinerator as phase two.

3.3 MANAGEMENT CONSIDERATIONS FOR PHASING

The decision to phase RD/RA activities should include certain considerations with respect to cost, project schedule, quality of product, and community relations.

By phasing, the RD/RA is broken down into smaller, discrete work elements which are more manageable and cost efficient and less subject to changes or cost increases. Cost estimates for subsequent work can be more precisely determined by building on the experience gained from prior work elements at the site. However, there may be redundancy in areas such as the design and procurement process, driving up total project cost. Also, the total cost of the final remedy is not certain until the last work element is implemented.

For scheduling purposes, the time frames for each work element will be less than for the project in its entirety. This situation allows evaluation of schedule trends during the project, thus allowing tighter control of the schedule. Improvement of a project's critical path schedule may be achieved by overlapping work element starts and concurrent actions in design and construction, such as initiating groundwater pump and treatment while source control design is still in progress. Be aware, however, that a project's critical path will not be improved if the phased work elements are not on the critical path.

Quality of individual work element design may be improved because knowledge obtained from prior work elements, or phases, can be integrated into design or operational considerations of subsequent work elements. This advantage does not apply, however, if the work elements are developed concurrently.

If a project is phased, there will be more than one contract to administer. Coordination of several contractors may be difficult, resulting in more administrative burden. Time may be lost and delay costs incurred if one contractor interrupts another's work. Therefore, the RMS should be carefully developed to better manage these projects.

Community perceptions may be improved by taking a phased work element approach, especially if the approach accelerates initial on-site activity. Phasing could help to alleviate concern over a lack of progress on appropriate remedial action.

Phasing can be an effective way to accelerate both a remedial action start and completion at a project site. As can be seen, however, the decision to phase involves an evaluation of many alternatives and considerations. Once the decision to phase is made, fast-tracking of individual phases should be evaluated as discussed in the following chapter.

CHAPTER 4

FAST-TRACKING REMEDIAL DESIGN AND REMEDIAL ACTION WORK ELEMENTS

4.1 INTRODUCTION

Fast-tracking is complementary to phasing. Whereas phasing is the process in which large complex projects are broken into smaller more manageable work elements, fast-tracking is a method to accelerate the implementation of those individual work elements. Fast-tracking techniques manipulate the internal steps required to complete each phased element, thereby optimizing the overall schedule. Depending on the complexity of the project, fast-tracking can be used in conjunction with phasing or by itself to achieve these benefits.

The internal steps to implement a phased element are often interdependent, i.e., some steps will rely on the completion of a previous step and cannot begin until that activity is completed. Other activities may have varying degrees of dependency, and some may be totally unconstrained and scheduled as simultaneous activities without regard to dependency. Fast-tracking techniques, which take these interrelationships into consideration, generally fall into one of the following descriptions:

- Eliminate. Steps in the process are eliminated or shortened. Because steps are often interrelated, however, this technique may create problems later on. For instance, deciding to use existing data previously collected during the RI/FS instead of collecting additional data during the remedial design will expedite the design process. This approach, however, may result in design delays if the RI/FS data turns out to be marginal or incomplete.

- Rearrange. The sequence or timing in which the steps are performed is rearranged to accelerate the overall schedule. An example might be to schedule design reviews in parallel with continuing design work so they are not on the critical path. Using this type of technique is usually done without assuming additional risk as long as no steps are eliminated or shortened.

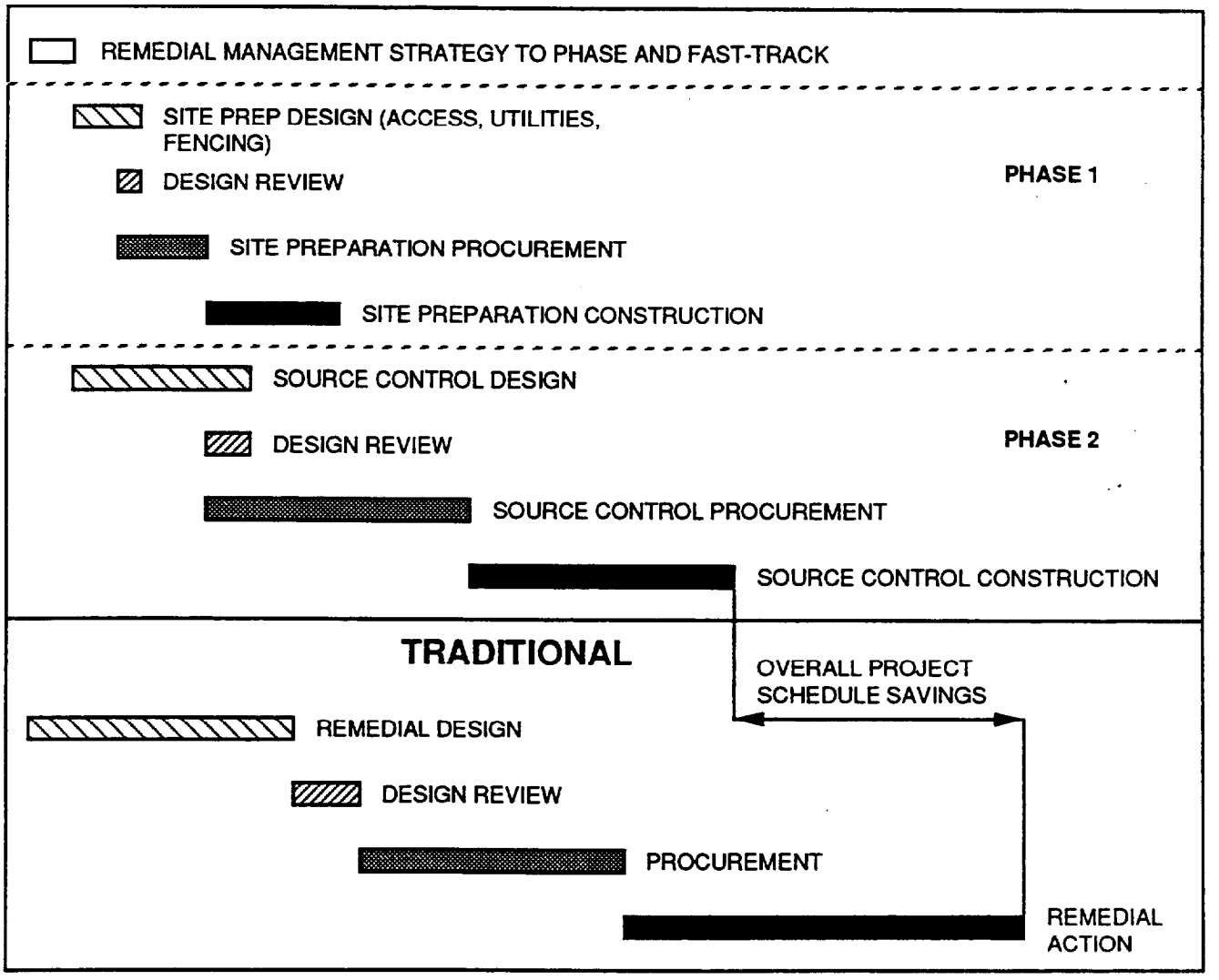
4.2 PROJECTS AND REMEDIAL WORK ELEMENTS MOST SUITED TO FAST-TRACKING

Most projects can be fast-tracked to expedite their schedules; however, the less complex the project or remedial work element, the more receptive it is to being accelerated by fast-tracking. This is because it is more likely that some standard tasks can be eliminated or shortened. For example, a simple project will probably not require a treatability study or value engineering study. Superfund projects that are more easily expedited typically exhibit the following characteristics:

- Technology. The applied remedy utilizes a proven technology.
- Data requirements. A treatability study is not required (or has already been completed during the RI/FS) and only minimal additional field data may be required.
- Value engineering. Based on the screening, a value engineering study is determined not to be needed.
- Intermediate design. Intermediate design submittal and review are not required. Other design reviews are done in parallel.
- Long-lead procurement. If long-lead procurement or fabrication is required, it is fast-tracked to keep it off the critical path.
- Real estate. There are no unusual real estate or permit requirements.

Assuming the above project characteristics, Figure 4-1 illustrates the relative time savings that may be achieved by phasing and fast-tracking a project. In the traditional approach, the entire remedial design is completed and then reviewed before initiating procurement. In the fast-track project scenario, site preparation construction is phased out of the remainder of the project using a clean work versus hazardous work criterion, and it is fast-tracked using standard specifications for the clean work. The remainder of the design for hazardous source control continues on the standard route through design. Assuming all design reviews are conducted in parallel, the fast-track procedures not only expedite the

FIGURE 4-1
PHASING AND FAST-TRACKING VERSUS TRADITIONAL RD/RA



This figure illustrates relative time savings that may be achieved by fast-tracking a project. In this example site preparatory work is started with a limited design while the design for the source control action continues. Assuming all design reviews are conducted in parallel, the fast-track procedures not only shorten the time necessary to initiate construction, but also accelerate completion of the project.

construction start, but also accelerate the completion of the project.

4.3 FAST-TRACKING TECHNIQUES

All remedial design and remedial action projects (whether phased or not) can take advantage of fast-track techniques to expedite their schedules. Because each project is unique, however, it is not possible to lay out a generic "cookbook" formula for fast-tracking. Each project should be analyzed based on the requirements and interrelationships of requisite activities. In other words, plan a strategy. The Remedial Management Strategy described in Chapter 2 is a valuable tool for this purpose. The following are some possible techniques that can be used to fast-track RD/RA activities:

- Design requirements. Reduce the detail required in the design package. For many small projects or portions of larger projects (i.e. soil excavation, dismantling of structures, simple pump and treat systems), the design need only include a site layout drawing and a basic description of the work to be performed. This may be contrary to the more conservative approach of providing a design with detailed specifications and drawings, but significant time and design cost savings may result.

- Standard specifications. Use of standard specifications enables completion of remedial designs in significantly less time. Standard specifications are inherently general in order to have a broad range of application. Since this can lead to vagueness when applied to a specific project, standard specifications should be modified as appropriate for the intended use. Various manufacturers, associations, and government agencies have developed standard specifications applicable to Superfund construction projects. Examples include the U.S. Army Corps of Engineers' specifications for remediation of hazardous waste sites, and the American Public Works Association's generic specifications. Use of these or similar specifications instead of, or in combination with, detailed design specifications will simplify and expedite design and equipment procurement activities.

- Specifications from a similar project. Many projects are similar in scope to projects that have already been designed. If these specifications are well prepared,

consider providing them to the designer of the new project. The specifications can then be modified as needed rather than starting from the beginning.

- Existing plans. During the scoping phase of a Remedial Investigation, project planning deliverables include a Health and Safety Plan, a Quality Assurance Project Plan, and a Community Relations Plan. Reuse these plans, as they may provide the basis for the doing the same types of plans required for remedial design and possibly the remedial action with little modification.

- Project continuity. For a Fund-lead project, time is saved in the transition from the ROD to remedial design if the same party, i.e., ARCS contractor, does both the RI/FS and the design. This assumes the contractor is qualified, has the available resources for the work, government regulations do not prohibit such work distribution, and there is no real or apparent conflict of interest. The benefits are that the EPA already has a working relationship with the firm, personnel are familiar with the project, and the firm has an established project file containing relevant documents and information.

- Site access. When agreements for RI/FS site access are developed, structure them to also allow for access during remedial design and possibly remedial action activities. Access and real estate concerns can be very time consuming and complicated. If these issues can be addressed in a comprehensive manner early in the project, they will pay significant time dividends later on.

- Value engineering. If a value engineering study is required, schedule to keep it off the design critical path. The only potential time impact from such a study should be caused by a design change, not from the value engineering process itself.

- Parallel design reviews. Schedule all design reviews in parallel with continuing design work so they are not on the critical path. Do all reviews simultaneously to expedite the resolution of recommendations.

- Early initiation of remedial action. Prepare remedial action work assignments before completing the remedial design. The first few weeks of a remedial action work

assignment are spent doing activities (i.e., preparing the remedial action work plan and collecting existing site information) that are not dependent on a completed remedial design. When the design is completed and approved, the procurement process can begin without delay.

- Long-lead equipment. Identify in advance any equipment that requires a significant amount of time to procure. Order in advance, if possible, to ensure that the item does not affect the critical path for the remedial action.

- Fast-track construction/staging. Many large projects can be divided into separate stages of construction. This is generally accomplished by letting each stage of work out for construction as soon as the design effort on that particular stage of work has been completed. This approach has the advantage that the project will be started and completed sooner than would be possible if it were necessary to wait until all design work had been completed. However, when multiple contracting efforts are underway simultaneously, more coordination and administrative oversight is required.

4.4 SUGGESTIONS TO IMPLEMENT FAST-TRACKING

Fast-tracking is a useful method to expedite a project or a remedial work element. The following suggestions may be helpful to the RPM when devising a fast-tracking strategy:

- Develop a strategy. Make a flow diagram which illustrates the tasks, durations, and precedence for the elements required by the project. A Gantt Chart is a simple example of such a diagram. Computer software is available which is simple to use, incorporates the use of classic scheduling techniques and concepts, provides various report features, and integrates graphic elements. Use the flow diagram as a project road map which can be kept current by adding and deleting elements as they are identified. This map will identify the critical path of the project and help ensure that non-critical steps do not become critical.

- Communicate. Communications are crucial because fast-tracking requires numerous concurrent activities which will be occurring with parallel and concurrent review

steps. Thus, expedited schedules will afford fewer defined stop-and-check points. Regular project communications (meetings, reports, and verbal) among appropriate decision makers or their representatives are necessary to eliminate false starts or misdirected activities.

- Target areas to fast-track. The areas most conducive to fast-tracking are the pre-design and design steps. During this time, most of the activities can be expedited. All can become critical if ineffectively managed (especially treatability studies, field data acquisition, EPA reviews, permits, and real estate). On the other hand, typical remedial action activities are less flexible because these activities may be constrained by procurement and contracting requirements discussed in Chapters 5 and 6.

- Identification of tasks. Identify all the tasks of a project that need to be fast-tracked. An overlooked task can become critical and delay or halt the project.

- Evaluate approach changes. When potential shortcuts in the remedial design or remedial action process are identified, weigh them prudently. Sometimes these shortcuts may have a hidden agenda. Eliminating or circumventing a step during design may significantly delay the project during remedial action.

The fast-track techniques described in this chapter can significantly expedite the remedial design and remedial action of a project. In many cases they are easy to implement and can be applied to all projects.