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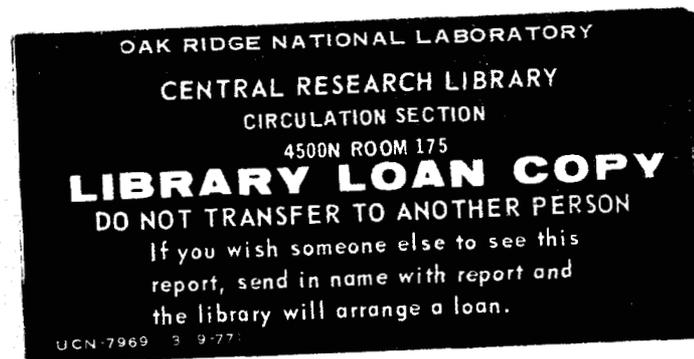
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Integrating NEPA and CERCLA Requirements During Responses at DOE Facilities

M. Beth Levine
Ellen D. Smith
Frances E. Sharples
Gerald K. Eddlemon

Environmental Sciences Division
Publication No. 3505



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ENVIRONMENTAL SCIENCES DIVISION

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DURING REMEDIAL RESPONSES AT DOE FACILITIES**

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ABSTRACT

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U.S. Department of Energy (DOE) Order 5400.4, issued October 6, 1989, calls for integrating the requirements of the National Environmental Policy Act (NEPA) with those of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for DOE remedial actions under CERCLA. CERCLA requires that decisions on site remediation be made through a formal process called a Remedial Investigation/Feasibility Study (RI/FS). All decisions by federal agencies are subject to NEPA, which requires environmental impact statements (EISs) for many major federal actions and under which other formal decision-making requirements have been established. CERCLA actions undertaken by the U.S. Environmental Protection Agency at nonfederal sites do not normally require NEPA documentation, but similar actions by other federal agencies are not considered to be exempt from NEPA requirements. According to the DOE order, integration is to be accomplished by conducting the NEPA and CERCLA environmental planning and review procedures concurrently. Integration is intended to (1) avoid duplicative effort and the associated larger commitment of resources that would be needed to implement both NEPA and the CERCLA RI/FS separately, (2) avoid conflicts in analysis and in the choice of a remedial alternative, and (3) minimize the risk of delaying remedial actions on procedural grounds. The primary instrument for integrating the processes is to be the RI/FS process, which will be supplemented as needed to meet the procedural and documentational requirements of NEPA. The final product of the integrated process will be a single, integrated set of documents; namely, an RI report and an FS-EIS that satisfy the requirements of both NEPA and CERCLA.

The RI/FS and NEPA processes are similar in many respects, but because there are some significant procedural and substantive differences between the two processes, integration is not entirely straightforward. The purpose of this document is to assist DOE facilities in complying with the DOE policy by presenting recommendations on (1) procedures for implementing a combined NEPA-CERCLA process and (2) the appropriate content for combined RI and FS-EIS documents. Although the report specifically addresses DOE, the majority of the information and recommendations presented should also be applicable to NEPA-CERCLA integration by other federal agencies.

The contents of the report include (1) an overview and comparison of the requirements of the two processes; (2) descriptions of the major tasks included in the integrated RI/FS-EIS process; (3) recommended contents for integrated RI/FS-EIS documents; and (4) a discussion of some potential problems in integrating NEPA and CERCLA that fall outside the scope of the RI/FS-EIS process, with suggestions for resolving some of these problems.

ACRONYMS

ARARs	Applicable or relevant and appropriate requirements
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulations</i>
DOE	U.S. Department of Energy
EA	Environmental Assessment
EH	DOE Office of the Assistant Secretary for Environment, Safety, and Health
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FONSI	Finding of no significant impact
FR	<i>Federal Register</i>
FS	Feasibility Study
HRS	Hazard Ranking System
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NPL	National Priorities List
PA	Preliminary Assessment
QA/QC	Quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SI	Site Investigation
USC	<i>United States Code</i>

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The contents of this report and the recommendations presented here are strictly the responsibility of the authors and do not represent the position of the U.S. Department of Energy (DOE), any DOE office, or any other organization. Several people and organizations made significant contributions, however, by providing invaluable advice and support.

The impetus for preparing this report came from DOE Oak Ridge Operations; HAZWRAP provided financial support and technical direction for our efforts. We appreciate these organizations and their staff for their support and their patience.

Andy Lawrence of the DOE Environmental Guidance Division shared copies of preliminary drafts of DOE guidance on integrating NEPA and CERCLA and permitted us to use these as the basis for the Appendices. Carl Bausch of the Council on Environmental Quality provided extensive advice on legal questions. Preliminary drafts of the manuscript were reviewed by Andy Lawrence and Leah Dever of the DOE Environmental Guidance Division, Clayton Gist and Rodger Jump of DOE Oak Ridge Operations, Carolyn Osborne of the DOE Office of NEPA Project Assistance, and Bob Reed and Fred Baes of ORNL. Portions of this report also reflect information and insights garnered in formal and informal discussions in the course of professional meetings and our other technical activities. We are grateful for all of these contributions.

1. INTRODUCTION

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that decisions on site remediation be made through a formal process called a Remedial Investigation/Feasibility Study (RI/FS). All decisions by federal agencies are subject to the National Environmental Policy Act (NEPA), which requires environmental impact statements (EISs) for major federal actions and under which other formal decision-making requirements have been established. CERCLA actions undertaken by the U.S. Environmental Protection Agency (EPA) at nonfederal sites do not normally require NEPA documentation, but similar actions by other federal agencies are not considered to be exempt from NEPA requirements. Under NEPA, agencies are directed to integrate the NEPA process with other required planning and environmental review procedures. Consistent with this directive, the U.S. Department of Energy (DOE) Order 5400.4 (CERCLA Requirements), issued October 6, 1989, calls for integrating the requirements of NEPA with those of CERCLA for DOE remedial actions under CERCLA. Other federal agencies may adopt similar policies.

DOE's policy on NEPA-CERCLA integration is set forth in DOE Order 5400.4. It incorporates policies established by a policy notice issued in August 1988 by the DOE Office of the Assistant Secretary for Environment, Safety, and Health. According to the order, integration is to be accomplished by conducting the NEPA and CERCLA environmental planning and review procedures concurrently. Integration is intended to (1) avoid duplicate effort and the larger commitment of resources that would be needed to implement both NEPA and CERCLA separately, (2) avoid conflicts in analysis and the choice of a remedial alternative, and (3) minimize the risk of delaying remedial actions on procedural grounds. The primary instrument for DOE's NEPA-CERCLA integration is to be the RI/FS process, supplemented as needed to meet the procedural and documentation requirements of NEPA. The final product of this integration will be a single, integrated set of documents; namely, an RI report and a combined FS report and EIS that satisfy the requirements of both NEPA and CERCLA.

The RI/FS and NEPA processes are similar in many respects, but because there are some significant procedural and substantive differences between the two processes, integration is not entirely straightforward. The purpose of this document is to assist DOE facilities in complying with the DOE policy by presenting recommendations on (1) procedures for implementing a combined NEPA-CERCLA process and (2) the appropriate content for combined RI and FS-EIS documents. Although this report is directed specifically to DOE, most of the information and recommendations should also be applicable to NEPA-CERCLA integration in other federal agencies.

An overview of the requirements of the two processes is presented in Sect. 2. Section 2 is intended to provide the reader with a general understanding of the key features of each process and to highlight parallel requirements as well as areas in which the two processes differ; it is not intended to provide authoritative information on the requirements of either CERCLA or NEPA. Readers who require comprehensive descriptions of the RI/FS or NEPA processes should consult with EPA for current guidance on the RI/FS process and with the DOE Office of NEPA Project Assistance for current DOE guidance on NEPA compliance. The principal sources of information for Sect. 2 were EPA's *Guidance for Conducting Remedial Investigations and Feasibility*

Studies Under CERCLA (EPA 1988a) and DOE's *Draft NEPA Compliance Guide* (DOE 1988).

Sections 3 through 5 of this document describe the major tasks in the integrated RI/FS-EIS process and appropriate contents for integrated RI/FS-EIS documents. This portion of the report is not intended to provide guidance on selecting the appropriate types of documents for a particular project. Instead, it is assumed that a decision has already been made to prepare an RI/FS-EIS, rather than alternative documents such as a combined CERCLA engineering evaluation/cost analysis and NEPA environmental assessment (EA). Section 3 outlines the major steps in the RI/FS-EIS process, while Sects. 4 and 5 describe recommended contents for the RI and FS-EIS reports, respectively.

In Sect. 6, we discuss some potential problems in integrating NEPA and CERCLA that fall outside the scope of the RI/FS-EIS process and suggest possible resolutions for some of these problems.

This document does not specifically address corrective actions required under the Resource Conservation and Recovery Act (RCRA). The EPA has not yet promulgated a process for selecting corrective action measures under RCRA Sects. 3004(u) and 3004(v). To the extent that RCRA corrective action requirements resemble the requirements of CERCLA, recommendations in this report will also be germane to NEPA-RCRA integration. The model provisions for Federal Facility Agreements between DOE and EPA under CERCLA Sect. 120 (Porter 1988) call for integration of RCRA corrective actions with CERCLA remedial actions. As a result, requirements for integration of RCRA with NEPA and CERCLA at DOE sites should be outlined in Federal Facilities Agreements, and the integrated NEPA-CERCLA-RCRA process is likely to be the same as the NEPA-CERCLA process discussed here.

2. STATUTORY AND REGULATORY BACKGROUND

2.1 NATIONAL ENVIRONMENTAL POLICY ACT PROCESS

NEPA directs federal agencies to consider the impacts of their actions on the human environment during their decision-making processes. Section 102(2)(C) of NEPA states that all "agencies of the Federal government shall . . . include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action" This detailed statement is presented in an EIS. Title II of NEPA created the Council on Environmental Quality (CEQ), which has the authority to adopt regulations to implement NEPA. CEQ's regulations, which include requirements for the content of an EIS as well as procedures for ensuring that the mandate of NEPA is carried out in all federal actions, are codified at 40 *Code of Federal Regulations* (CFR) Parts 1500-1508. Individual agencies are required to adopt procedures for NEPA compliance within the agency (40 CFR §1507.3). DOE published its NEPA guidelines in the *Federal Register* (FR) on December 15, 1987 (52 FR 47662).

NEPA's EIS requirement places a nondiscretionary duty on federal agencies to evaluate the environmental effects of their decisions so that alteration and use of the environment is planned and controlled rather than arbitrary. The CEQ regulations [40 CFR §1500.1(c)] state, "The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment." The EIS also serves to inform the public of the environmental consequences of proposed federal actions: "NEPA procedures [are intended to] insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken" [40 CFR §1500.1(b)].

2.1.1 Determining the Need for an Environmental Impact Statement

An important step in the NEPA process is to determine whether an EIS is needed. If the need for an EIS is uncertain, an agency should prepare an EA, in which information is analyzed to determine whether impacts are sufficient to warrant the preparation of an EIS or whether a "Finding of No Significant Impact" (FONSI) can be issued. To aid in determining the appropriate form of NEPA documentation, agency NEPA procedures classify many typical agency actions in three categories: (1) actions that normally require an EIS, (2) actions that normally require an EA, and (3) "categorical exclusions," actions that normally do not require either an EIS or an EA because they are individually or cumulatively deemed to have no significant impact on the human environment. The DOE's current classifications are included in the DOE NEPA guidelines (52 FR 47662). On April 6, 1990 (55 FR 13064) DOE proposed amendments to its NEPA guidelines that add most CERCLA removal actions and site

characterization activities to the list of categorical exclusions. These proposed amendments are effective on an interim basis pending final publication.

If an action is not categorically excluded, it may still be exempt from the requirement for an EIS because it fails the "threshold question" test. To meet this test, the proposed action must (1) be a "federal" action, (2) qualify as "major," and (3) have "significant" impact on the environment. The expenditure of DOE funds on remedial actions clearly constitutes "federal" action. In many instances, the magnitude of this expenditure can easily be construed as making the remedial action "major." The most problematic decision element of the test is, therefore, the determination of "significance."

The CEQ regulations specify (40 CFR §1508.27) that the interpretation of significance must consider both the "context" and "intensity" of the impacts of a proposed action. "Context" addresses the scale on which the impacts may have significance (e.g., local, regional, or national). "Intensity" addresses the severity of impact and is evaluated based on several considerations specified in the regulation. Among the considerations that may pertain to remedial actions are the following [40 CFR §1508.27(b)]: "(1) Impacts may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial. (2) The degree to which the proposed action affects public health and safety. . . . (4) The degree to which effects on . . . the environment are likely to be highly controversial. (5) The degree to which the possible effects on . . . the environment are highly uncertain or involve unique or unknown risks. . . . (7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. . . Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts."

If the significance of the impacts of a proposed action is uncertain, an agency should prepare an EA. It is DOE's policy to integrate the preparation of EAs with RI/FSs in much the same way as EISs and RI/FSs are to be integrated.

2.1.2 Planning and Timing of NEPA Implementation

CEQ's implementing regulations require that an agency integrate the NEPA process into project planning at the "earliest possible time" so that decisions reflect consideration of environmental values. Early attention to NEPA planning and timing also prevents delays that might occur later because of failure to consider NEPA. Planning should involve a "systematic, interdisciplinary approach" to evaluating the full range of environmental consequences, including economic and social effects as well as physical and natural impacts.

2.1.3 NEPA Scoping

40 CFR §1501.7 defines scoping as "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." NEPA scoping identifies the range of alternatives and impacts that the agency will consider in an EIS and, subsequently, in its decisions on a proposed action. Issues that are not significant or have been covered by previous EISs are identified and eliminated from consideration. Scoping also includes the allocation of assignments for EIS preparation among the lead agency and any cooperating agencies, identification of plans for related NEPA documents and for integrating NEPA with

other environmental review requirements, and declaration of the agency's tentative decision-making schedule.

A major goal of NEPA is providing the public, state, other federal agencies, and other interested parties an opportunity to present their views and comments on a proposed federal action and its alternatives. The scoping process is a major element in ensuring that this goal is met. The scoping process is initiated by the publication of a Notice of Intent (NOI) in the FR as soon as the need for an EIS has been determined (40 CFR §1508.22). Other affected agencies and the public must be notified of the intent to prepare an EIS and of plans for scoping. The process may involve one or more public meetings during which the agency describes its approach to preparation of the EIS and receives verbal and written comments from interested parties. Following a notice by DOE Secretary Watkins on February 5, 1990, public scoping meetings are required for DOE EISs (Watkins 1990). Other methods may also be used to elicit public and agency opinion concerning issues and alternatives to be considered.

Although scoping is typically started at the earliest stages of the NEPA process, it is a continuous process throughout the preparation of the EIS. Plans made during early scoping activities must be revised if the proposed action is later substantially changed or if significant new circumstances or information arise.

2.1.4 Content of EIS

The content of the EIS is driven by its purpose: "It shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment" (40 CFR §1502.1). The main sections of an EIS are a statement of the purpose and need for action, a description of the affected environment, analysis of environmental consequences, and a comparison of alternatives (40 CFR §1502.10). CEQ's regulations place a major emphasis on developing and analyzing reasonable alternatives, of which the proposed action is one. CEQ considers the analysis of alternatives to be "the heart of the EIS" (40 CFR §1502.14). This analysis should "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public" (40 CFR §1502.14). The range of alternatives is established during scoping and should include "all reasonable alternatives." An agency should "devote substantial treatment" to each alternative considered in detail so that the comparative merits of each can be evaluated. The reasons for eliminating any alternatives from detailed study should be briefly discussed. Analysis of a "no action" alternative must be included.

2.1.5 Publication of EIS

The agency must circulate its draft EIS to other government agencies and interested members of the public. Notice of its availability must be published in the FR and a minimum 45-day period must be allowed for public comment on the draft. The agency must assess and consider comments both individually and collectively and respond to agency and public comments in the final, published EIS (40 CFR §1503.4).

The CEQ regulations provide that no decision be made on the proposed action until at least 30 days after the EPA publishes an FR notice indicating that the final EIS has been filed with the EPA (40 CFR §1506.10).

2.1.6 Record of Decision

Following publication of a final EIS, the agency must publish a record of decision (ROD) in the FR (40 CFR §1505.2). The ROD states the agency's decision, identifies the alternatives that were considered and the environmentally preferable alternative, and indicates whether the agency has adopted "all practicable means to avoid or minimize environmental harm" from the selected alternative. There is no requirement that an agency select the environmentally preferred alternative, but the ROD should explain the basis for the agency's decision. This discussion may include such factors as economic and technical considerations, agency statutory missions, and considerations of national policy. The ROD may commit the agency to implementing measures to mitigate potential adverse impacts identified in the EIS.

2.2 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT PROCESS

CERCLA establishes a national program for responding to uncontrolled releases of hazardous substances into the environment. The operational centerpiece of CERCLA's remedial action program is the National Oil and Hazardous Substances Contingency Plan (NCP), which is codified at 40 CFR 300, Subpart F. The NCP provides the framework for identifying, evaluating, and selecting remedial actions, and describes the factors to be considered in the remedial process. The phases of the NCP remedial response process are described in the subsections below.

EPA published revisions to the NCP in the FR on March 8, 1990 (55 FR 8666). The revisions are intended to (1) conform with regulatory changes required by the Superfund Amendments and Reauthorization Act (SARA), (2) reflect more accurately the sequence of response actions, and (3) clarify existing NCP language. Revisions to the NCP had been proposed earlier (December 21, 1988; 53 FR 51394), and EPA incorporated the proposed revisions into its interim final guidance on the RI/FS process (EPA 1988a, 1989a, 1989b). This guidance is the basis for much of the discussion below. Future EPA guidance can be expected to incorporate those elements of the revised NCP that differ from the proposed version.

2.2.1 Site Discovery and Notification

The first phase of the NCP remedial response process is site discovery and notification. The goal of this phase is to identify sites of actual or potential uncontrolled release of hazardous substances and to have these sites reported to the EPA.

2.2.2 Preliminary Assessment and Site Investigation

The overall goal of the preliminary assessment and site investigation (PA/SI) is to collect sufficient information to determine whether a release of hazardous substances into the environment has occurred. The PA involves the collection of existing data on the site, including a characterization of the substances it contains and the site's environmental features. An SI is conducted if existing information is inadequate to draw valid conclusions about any actual or potential hazardous substance releases. The SI normally includes the collection of environmental samples to determine whether a release or potential release warrants further action.

2.2.3 Establishing Priorities for Remedial Action

To establish priorities for remedial action, sites are scored using data from the PA/SI and the Hazard Ranking System (HRS) as described in Appendix A of 40 CFR Part 300. The HRS is the primary mechanism used by the EPA to identify sites for potential inclusion on the National Priorities List (NPL). Those sites that are listed on the NPL must undergo a more detailed study, the RI/FS. SARA requires the EPA to revise the HRS so that it evaluates "as accurately as possible" the relative risk that hazardous waste sites pose to human health and the environment. EPA proposed revisions to the HRS on December 23, 1988, (53 FR 51962), but these revisions had not been finalized as of April 1990.

2.2.4 Remedial Investigation and Feasibility Study

The RI/FS process has two principal elements: the RI and the FS. The goal of the RI is to fully characterize the extent of the problems identified in the PA/SI. Information collected in the RI is used in the FS, which has the purpose of developing, screening, analyzing, and selecting an appropriate remedial action alternative. The RI and the FS are conducted concurrently, although the RI is normally completed earlier than the FS.

The RI activities include "scoping," which in this context involves analyzing existing data to determine what additional data are necessary to evaluate the potential effects of a site on human health and the environment. This includes characterizing the known or suspected sources of contamination, the probable pathways by which these contaminants can migrate, and the potential receptors that may be affected by contaminant migration. The procedures for collecting any additional data are outlined in a Sampling and Analysis Plan.

As part of the RI scoping process, the lead agency (i.e., the agency managing the cleanup) must prepare and implement a community relations plan [40 CFR §300.430(c)]. The community relations plan should specify the means for conducting two types of activities: (1) providing opportunities for the community to learn about the site and the progress of the RI/FS and (2) providing opportunities for public and community involvement in site-related decisions, including site analysis and characterization, alternatives analysis, and selection of remedy. Project community relations plans are supposed to be tailored to the community and the site, but some specific requirements apply to all sites. Complete guidance for CERCLA community relations activities has been developed by EPA (1988b).

During the RI, the sampling and analysis plan developed during scoping is implemented and field data are collected and analyzed. Topics of investigation typically include site surface features, geology, hydrologic and meteorologic conditions relevant to potential contaminant transport, characterization of human populations potentially exposed to contaminants released from the site, ecological studies, and characterization of the nature, sources and extent of contamination. Field investigation may be an iterative process if field activities and laboratory analyses show that site conditions are significantly different than originally believed. Data analysis in the RI focuses on analysis of source characteristics, the nature and extent of contamination, contaminant transport and fate, and effects on human health and the environment (EPA 1988a). A baseline risk assessment, conducted in accordance with EPA guidance (EPA 1989c and 1988a), is a part of the RI. The baseline risk assessment is normally documented in a separate report and summarized in the RI report.

A draft report documenting the RI must be produced for review by support agencies. The draft RI report also must be supplied to the Agency for Toxic Substances and Disease Registry (a branch of the Centers for Disease Control) for its use in preparing a health assessment for the site.

The focus of the FS is a comparative analysis of remedial alternatives. The EPA's RI/FS guidance (EPA 1988a) contains detailed specifications for developing, screening, and evaluating alternatives. The guidance states that the alternatives analyzed should include (1) a no-action alternative; (2) a range of alternatives in which treatment significantly reduces the toxicity, mobility, or volume of the wastes; and (3) one or more alternatives that involve containment with little or no treatment. Alternatives are preliminarily screened using broad criteria of effectiveness, implementability, and cost. The alternatives remaining after this preliminary screening are then evaluated against nine specific criteria:

- overall protection of human health and the environment;
- compliance with applicable or relevant and appropriate requirements (ARARs);
- long-term effectiveness and permanence;
- reduction of toxicity, mobility, and volume;
- short-term effectiveness;
- implementability;
- cost;
- state acceptance; and
- community acceptance.

Considerations of environmental consequences are included in the EPA's detailed descriptions of these criteria (EPA 1988a). For example, the criterion of "short-term effectiveness" includes considerations of any adverse environmental impacts from implementing the remedial action, methods for mitigating these impacts, and costs of such mitigation. Similarly, the requirement to identify and comply with ARARs (see Sect. 3.1.7) should unearth many concerns typically addressed in NEPA analyses (e.g., impacts on archeological and historical resources).

Following completion of the RI and FS, draft reports are supplied to CERCLA support agencies (e.g., EPA and the state) for comment. Following receipt and resolution of these agency comments, the lead agency publishes RI and FS reports (or a

combined RI/FS report), together with the proposed plan (see Sect. 2.2.5), for public review and comment. A minimum 30-day period must be allowed for public comment. Following evaluation of public comments, the RI/FS document, which includes an identification of the agency's favored alternative, is published and placed in the administrative record.

2.2.5 Proposed Plan and Record of Decision

A proposed plan is required by CERCLA Sect. 117(a). The proposed plan is a public participation document that identifies the preferred alternative and summarizes salient information from the RI/FS reports regarding the selection of the preferred alternative. The EPA has issued interim final guidance on the preparation of this document (EPA 1989a).

After the public comment period for the RI/FS report and the proposed plan, a final alternative is selected for adoption and a ROD is prepared. The ROD is drafted by the lead agency and must be approved by the EPA. The NCP dictates the contents of the ROD and the community relations requirements that must be adhered to once the ROD is signed [40 CFR 300.430(f)]. According to EPA guidance (EPA 1989a), the ROD describes the engineering components and remediation goals of the selected remedy, certifies that the remedy selection process was carried out in accordance with CERCLA requirements, and provides a consolidated source of information about the site and the rationale for the selected remedy. A responsiveness summary addressing public comments on the RI/FS report and the proposed plan must be included in the ROD. If significant changes have been made to the proposed plan, the ROD must document these changes. Major changes may require issuance of a revised proposed plan and a new public comment period before the ROD is signed. The signed ROD is placed in the administrative record.

2.2.6 Remedial Design and Remedial Action

The penultimate phase of the NCP process is remedial design. This phase involves the development of technical drawings and specifications for the remedial action selected as the result of the earlier phases. After completion of remedial design, the remedial action is implemented. When all phases of remedial activity at a site have been completed and no further remedial action is warranted, the site may be deleted from the NPL.

2.3 COMPARISON OF NEPA AND CERCLA

The NEPA EIS and CERCLA RI/FS processes differ in purpose, but there are some significant similarities in content that should facilitate NEPA/CERCLA integration. Some fairly subtle differences need to be recognized, however, when attempting to integrate the two processes. These include differences in underlying philosophy, scope, specific procedures, and in the meanings given to terms that are common to the two statutes.

2.3.1 Purpose

The purposes of remedial actions under CERCLA are to identify, investigate, and clean up contamination from uncontrolled releases of hazardous substances. The RI/FS process is tailored to remedial action decisions; it assesses site conditions and evaluates alternative remedies to the extent necessary to select an appropriate remedial action. The primary goal of NEPA is broader (i.e., to incorporate environmental considerations into the decision-making processes of federal agencies). Procedural requirements of NEPA are applicable to the universe of federal actions and are intended to ensure that all reasonable alternative courses of action are identified and that the environmental consequences of proposed actions are investigated, weighed against other considerations involved, and fully disclosed to the public.

Both processes involve the identification and analysis of alternative courses of action, provide for public participation in the decision process, and provide for concurrent consideration of other environmental review and regulatory requirements. The two processes include similar phases (e.g., a scoping phase, a data collection phase, and analysis of alternatives) and the results of both are formally documented in RODs. Because the RI/FS process is narrower in scope, however, its requirements tend to be more focused. Also, whereas the primary purpose of RI/FS reports appears to be to document the decision process, the EIS is itself supposed to be a decision-aiding document that is, according to regulations, "more than a disclosure document" (40 CFR §1502.1).

2.3.2 Focus and Timing of Processes

One area in which NEPA and CERCLA differ is in the timing prescribed for implementation. The NEPA regulations require agencies to "integrate the NEPA process with other planning at the earliest possible time" (40 CFR §1501.2) and to commence preparation of an EIS "early enough that it can serve practically as an important contribution to the decision process and will not be used to rationalize decisions already made" (40 CFR §1502.5). For projects directly undertaken by a federal agency (as in the case of CERCLA remedial actions), the EIS is to be prepared "at the feasibility analysis (go-no go) stage and may be supplemented at a later stage if necessary" [40 CFR §1502.5(a)]. Furthermore, agencies are admonished not to "commit resources prejudicing selection of alternatives before making a final decision" [40 CFR §1502.2(f)]. In contrast, the RI/FS process involves identification and comparison of detailed engineering alternatives, requiring a level of development beyond the feasibility analysis stage cited in the NEPA regulations and sometimes requiring treatability investigations that involve large enough resource commitments to prejudice the subsequent selection of alternatives.

A related problem concerns the identification or subdivision of actions requiring analysis. Under CERCLA, complex response actions may be separated into several "operable units" for purposes of RI/FS analysis and conducting remedial or removal actions [40 CFR §500.68(c)]. Each operable unit is a discrete part of the entire response action, for example, a particular geographic area of the site, contaminant source, exposure pathway, or remedial measure (e.g., the removal of contaminated material from a part of a site might be defined as a single operable unit). Implementation of some operable units may begin before selection of a final remedial

action if such measures are "cost-effective and consistent with a permanent remedy" [40 CFR §500.68(c)]. In contrast, NEPA regulations and case law require that associated actions be evaluated together. The CEQ regulations [40 CFR §1502.4(a)] state: "Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement." Furthermore, 40 CFR §1508.25(a) states that connected actions and cumulative actions should be covered by the same EIS. "Connected actions" include actions that "cannot or will not proceed unless other actions are taken previously or simultaneously" and actions that "are interdependent parts of a larger action and depend on the larger action for their justification." "Cumulative actions" are those "which when viewed with other proposed actions have cumulatively significant impacts." Thus, it would not be acceptable to subdivide a complex site into operable units for purposes of NEPA analysis.

To resolve these differences with respect to the timing and focus of the CERCLA and NEPA processes, we recommend that agencies adopt a tiered approach to NEPA implementation. The tiering option is discussed in Sect. 6.

2.3.3 Scope of Analyses

The two laws differ with respect to methods for identifying alternatives and the universe of alternatives that requires consideration. The EPA RI/FS guidance includes procedures for identifying alternatives, prescribing a multistep process in which the FS preparer screens the universe of potential remedial-action technologies to identify those technologies and alternatives that are reasonable for a particular operable unit (EPA 1988a). As a result, alternatives analyzed in the FS usually are the no-action alternative and several different technical approaches to remedial action. The NEPA regulations have no similar requirements intended to ensure that NEPA alternatives are technically appropriate. Instead, NEPA regulations state that "all reasonable alternatives," including the no-action alternative and alternatives outside the jurisdiction of the lead agency, should be "rigorously explored and objectively evaluated" (40 CFR §1502.14), even if these alternatives are inconsistent with legal mandates (CEQ 1981). Also, the public and other federal agencies should have significant input on identification of alternatives during the NEPA scoping process, although identification of reasonable alternatives is ultimately left to the judgment of the agency preparing the EIS. The FS process does not require public participation in identifying alternatives prior to analysis; the public's primary contribution is in reviewing the scope of the alternatives addressed in the published FS report. The difference in the role of outside groups in identifying alternatives is one reason that "scoping" has rather different meanings under the two laws (see Sects. 2.1.2 and 2.2.4) and was taken into account in developing the recommendations for the scoping process in Sect. 3.1.

These differences in identification of alternatives may not change the substance of the decision-making process; the types of alternatives considered in an FS probably are also the most "reasonable" alternatives for most remedial action sites. The NEPA approach is, however, more likely to involve formal consideration of alternatives that involve disposal at different sites, incorporate radically different approaches suggested by concerned citizens, or are outside the jurisdiction of the lead agency. Also, integration with NEPA appears to necessitate some changes in the FS documentation on development of alternatives, as discussed in Sect. 5.3.

Not only do the laws differ in identifying the range of alternatives requiring analysis, but the scope of environmental impacts to be considered in an EIS is broader than what generally must be considered in an RI/FS. Both EISs and RI/FS reports must consider environmental impacts, compliance with applicable environmental regulations, and measures to mitigate adverse impacts. In calling for a discussion of environmental consequences, however, the NEPA regulations (40 CFR §1502.16) define environmental effects broadly, including direct, indirect, and cumulative impacts, "any adverse environmental effects which cannot be avoided should the proposed action be implemented, the relationship between short-term uses of man's environment and the maintenance of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved." Not only adverse impacts, but also beneficial impacts, may warrant discussion (40 CFR §1508.27). Other topics that must be considered in presenting "environmental consequences" in an EIS include (40 CFR §1502.16):

- "Possible conflicts between the proposed alternative and the objectives of federal, regional, state, and local . . . land use plans, policies, and controls for the area concerned";
- "Energy requirements and conservation potential of various alternatives and mitigation measures";
- "Natural and depletable resource requirements and conservation potential of various alternatives and mitigation measures"; and
- "Urban quality, historic and cultural resources, and the design of the built environment."

Sections 4 and 5 contain recommendations for combined NEPA-CERCLA documents in which the scope of analyses should meet the requirements of both laws. An additional measure that should help to resolve potential conflicts in this area is selection of a project team that includes individuals familiar with each process. This recommendation is discussed in Sect. 6.

2.3.4 Documentation Requirements

The NEPA EIS and CERCLA RI and FS reports differ substantially in the nature of their discussions. Under NEPA, agencies preparing EISs are exhorted to make them "analytic rather than encyclopedic," to make documents concise, to discuss potential impacts in proportion with their significance (40 CFR §1500.2), and to limit information on the "affected environment" to "no longer than necessary to understand the effects of the alternatives." EISs are to be "written in plain language and . . . use appropriate graphics so that decisionmakers and the public can readily understand them" (40 CFR §1502.8). Agencies are asked to "employ writers of clear prose or editors to write, review or edit statements" (40 CFR §1502.8). To help ensure that documents are focused and accessible to readers, the CEQ regulations recommend limiting the number of pages: "The text of final environmental impact statements . . . shall normally be less than 150 pages and for proposals of unusual scope or complexity shall normally be less

than 300 pages" (40 CFR §1502.7). This is accomplished in part by incorporating some material by reference and by merely summarizing complex technical information in the text, while providing technical details in appendices. In contrast, the RI/FS guidance (EPA 1988a) calls for comprehensive compilation of data in RI reports and neither requires nor encourages efforts to make RI and FS reports understandable to the lay public. In the RI/FS process it is the proposed plan, not the RI and FS reports, that is designed to provide focused information on the decision process and to be understood by the public (see Sect. 2.2.5).

2.3.5 Provisions for Ensuring Quality in Analyses

Both the CERCLA and NEPA processes have requirements intended to ensure the quality and integrity of the information on which decisions are based. The requirements focus, however, on different aspects of information quality.

Site investigations conducted under CERCLA are subject to extensive quality assurance and quality control (QA/QC) requirements. To be included in RI/FS documents, data must meet formal QA/QC criteria for data acceptability. These criteria typically emphasize quality control in sample acquisition and analysis, including such considerations as chain-of-custody control of samples. In contrast, NEPA does not have any specific criteria for acceptability of data or other information to be considered in a NEPA document. In fact, to address public concerns, it may be necessary for a NEPA document to report and discuss information whose validity is highly questionable.

NEPA requirements for the integrity of impacts analyses focus on the qualifications of the people who prepare NEPA documents and on documentation of the basis for conclusions reported in EISs. Thus, an EIS must be prepared by a qualified interdisciplinary team (40 CFR §1502.6); it must contain a list of the preparers and their professional qualifications (40 CFR §1502.17); methodologies used in analyses must be identified; and all sources relied upon for conclusions must be cited (40 CFR §1502.24). The CERCLA process does not appear to have requirements that are directly parallel, although the need for qualified personnel is implicit and work plans and draft reports must be reviewed and approved by EPA (EPA 1988a).

2.3.6 Involvement of Other Government Agencies

Both the NEPA and CERCLA processes provide for formal involvement by the states and by federal agencies other than the lead agency. Under NEPA, agencies that may be involved in the proposed action, including issuance of any required permits, are designated "cooperating agencies." Cooperating agencies are required to participate in the scoping process; they may be asked to assist in developing information or preparing environmental analyses (40 CFR §1501.6); and they have a duty to comment on the draft EIS, as does any other federal agency "with jurisdiction by law or special expertise with respect to any environmental impact involved" (40 CFR §1503). Similarly, the CERCLA regulations (40 CFR Part 300) call for extensive coordination with other federal agencies and the affected state(s). Guidance for the RI/FS process provides for review and concurrence on documents by "support agencies;" for federal agency remedial actions, the RI/FS support agencies would be the EPA and the state agency having "Superfund" responsibility.

2.3.7 Public Participation

Both NEPA and CERCLA provide for public involvement in the decision-making process. Although their public participation requirements are different, they do not appear to be incompatible. Thus, it should be possible to develop a community relations program that meets the requirements of both processes.

The stated objective of public involvement under NEPA is to "insure that environmental information is available to . . . citizens before decisions are made and before actions are taken" (40 CFR §1500.1). NEPA requires formal public participation at a few defined points in the process (i.e., scoping and the opportunity to comment on the published draft EIS) and encourages other measures to "solicit appropriate information from the public" and to explain "where interested persons can get information or status reports on environmental impact statements and other elements of the NEPA process" (40 CFR §1506.6).

Guidance for CERCLA implementation (EPA 1988a) indicates that community relations activities should "focus on providing information to the community . . . and obtaining feedback on community interests and concerns," with the objective of "educat[ing] the public on the remedial process and keep[ing] the community informed of project developments as they occur, thereby reducing the likelihood of conflict arising from lack of information, misinformation, and speculation." Public participation under CERCLA is an element of the project-specific community relations program that is carried out throughout the RI/FS process and also includes the opportunity to comment on the published RI/FS documents. Typical community relations activities during the RI/FS process include public information meetings at the beginning and end of the RI/FS process, small group meetings and workshops for local officials and concerned citizens, and issuance of fact sheets and press releases describing the alternatives being considered.

There are noteworthy differences between the two processes' provisions for public comments on published documents. In the NEPA process, a draft EIS is published for public review and agency comment; responses to comments are incorporated in the final EIS. In the CERCLA process, as it is described in EPA guidance (see Sect. 2.2), only supporting agencies are invited to comment on draft RI and FS reports; the published RI and FS reports made available for public review are final documents. Responses to public comments on these documents and the associated proposed plan, including any changes made as a result of public comment, are published in the CERCLA ROD. Also, mandatory minimum public comment periods are longer under NEPA (45 days) than under CERCLA (30 days). Finally, whereas CERCLA regulations provide that comment responses be reported in "a document which summarizes the major issues raised by the public and how they are addressed" [40 CFR §300.67(e)], the CEQ regulations (40 CFR §1503.4) call for the comments themselves to be included with the published final EIS: "All substantive comments received on the draft statement (or summaries thereof where the response has been exceptionally voluminous), should be attached to the final statement whether or not the comment is thought to merit individual discussion by the agency in the text of the statement."

2.3.8 Record of Decision

The decisions reached in both the NEPA and CERCLA processes are documented by issuance of RODs. The RODs issued in both processes must identify the agency's decision and explain the basis for it. Both processes have, however, specific and unique requirements for the contents of the ROD (see Sects. 2.1.6 and 2.2.5) that will require careful attention in an integrated NEPA-CERCLA process.

There are also procedural differences in the issuance of the ROD. Under NEPA, the agency preparing the EIS also prepares and issues the ROD following a 30-day waiting period to allow for EPA or other federal agencies to refer the EIS to CEQ if they judge that the proposed action might cause unsatisfactory environmental effects. Neither EPA, CEQ, or any other federal agency normally must approve the proposed action as a condition of its adoption and implementation by the lead agency. Under CERCLA, however, the ROD must be approved by EPA. The lead agency may prepare the ROD itself or it may submit all the pertinent information to EPA, which then prepares the ROD for it. DOE and EPA have agreed (Porter 1988) that DOE will prepare CERCLA RODs for DOE remedial actions and transmit draft RODs to EPA for review and approval. This procedure should not pose problems in integrating the two processes.

2.3.9 Judicial Review

A final difference between the NEPA and CERCLA processes concerns provisions for judicial review of agency decisions. CERCLA provides that citizens may not bring suits alleging that a remedy selected under the process violates any CERCLA provision until the remedial action (or removal if no future remedial action will be taken at the site) is completed [42 United States Code (USC) §9613(h)]. This moratorium on judicial review is intended to allow EPA to act promptly to alleviate risks from hazardous substances rather than allowing remedial actions to be delayed during legal battles over the remedy. NEPA contains no specific statutory provision on judicial review, and NEPA cases are adjudicated under the Administrative Procedures Act (5 USC §702). CEQ's regulations (40 CFR §1500.3), however, set the timing of judicial review for NEPA cases: "It is the Council's intention that judicial review of agency compliance with these regulations not occur before an agency has filed the final environmental impact statement, or has made a final finding of no significant impact . . . or takes action that will result in irreparable injury." NEPA litigation typically questions either an agency's decision not to prepare an EIS or the adequacy of an EIS that was prepared. NEPA regulations thus permit judicial review after the final EIS is issued but before action begins, while CERCLA bans judicial review until after remedial action is completed.

Because NEPA is silent on the timing of judicial review, it is expected that CERCLA's prohibition on judicial review would take precedence when the two processes have been integrated (Carl Bausch, General Counsel, CEQ, personal communication to F. E. Sharples, August 14, 1989). Accordingly, citizens would be prohibited from intervening over an allegedly inadequate EIS until after the remedial action is complete. It is not apparent, however, that the CERCLA prohibition on judicial review would bar citizen suits over an agency's failure to prepare an EIS. Also, it should be noted that CERCLA's prohibition on judicial review is not absolute.

Unlike citizens, states can intervene prior to the signing of a ROD in cases in which proposed remedial actions for federal facilities do not attain ARARs. Under CERCLA [42 USC §9621(f)(3)], EPA must provide a state with an opportunity to concur with the remedy selected at least 30 days before the publication of the final remedial action plan. If the state does not concur, it may bring an action to determine whether the decision for the proposed action is supported by substantial evidence. If it is not supported, the remedial action must be modified to conform with the ARAR.

NEPA and CERCLA also differ with respect to the nature and scope of the record that may be reviewed by the courts. Under CERCLA, judicial review of issues that involve the adequacy of a response action is limited to the administrative record [42 USC 9613(j)]. The administrative record for CERCLA actions includes all documents that form the basis for the selection of a response action, such as the RI/FS work plan, risk assessment reports, RI report, FS report, proposed remedial action work plan, and ROD. The administrative record may also include site characterization data, treatability studies, chain-of-custody forms, and transcripts of public meetings. These limitations are intended to limit the scope of discovery during a trial and limit challenges of the decision to those scenarios actually considered in selecting the remedy. Neither NEPA nor the CEQ regulations contain provisions to define or limit the scope of judicial review. Case law has dictated, however, that judicial review under NEPA also be limited to the administrative record but has allowed extra-record evidence when the administrative record is incomplete or when the agency's decision is unclear (Mandelker 1984). Under NEPA, the administrative record contains the EIS or an EA and any supporting documents and studies. The CERCLA limitation on the scope of judicial review may mean that the record open for judicial review in an integrated NEPA-CERCLA process will be more restricted than if the process had been carried out under NEPA alone.

3. SCOPING AND PROJECT PLANNING

3.1 SCOPING

The objective of RI/FS-EIS scoping is to determine the range of issues to be addressed during the combined RI/FS and NEPA process. Scoping involves the identification of significant issues, preliminary identification of the range of alternatives to be evaluated, a review and analysis of existing data, and the identification of data gaps. It should help ensure that (1) issues are identified early in the planning process and are properly studied, (2) time and effort are not expended on issues of little significance, and (3) any delays that might be caused by inadequate handling of NEPA in the FS-EIS are avoided. The culmination of this process is a combined RI project plan and EIS implementation plan. This document outlines how the RI will be conducted to ensure that any missing information identified during scoping is collected, and it provides guidance for the preparation of the FS-EIS.

As noted by DOE Order 5400.4, an early determination on the appropriate level of NEPA documentation for a remedial action project is a key element in the success of an integrated NEPA-CERCLA process. To avoid delays, the order recommends that the NEPA determination be made "prior to entering the RI/FS scoping process or as soon thereafter as is possible so that appropriate RI/FS-NEPA planning is achieved early in the process."

The discussion below outlines the main steps in the RI/FS-EIS scoping process. The process described below follows EPA's RI/FS guidance (EPA 1988a), with additions and modifications to accommodate the requirements of NEPA. More complete information on scoping and project planning in the two processes can be found in the guidance materials cited.

3.1.1 Issue a Notice of Intent

The CEQ NEPA regulations and DOE NEPA guidelines require that an NOI be published in the FR as soon as practicable after the decision has been made to prepare an EIS. Publication of the NOI initiates the EIS process. Under DOE's NEPA procedures (DOE 1987), the NOI is a vehicle for (1) inviting comments and suggestions on the proposed scope of the EIS and (2) inviting public participation in the NEPA process. The NOI should describe the proposed action (i.e., to address the uncontrolled release of hazardous substances from a DOE site), possible alternatives (e.g., no-action, cleanup methods), DOE's intent to prepare an integrated RI/FS-EIS, the proposed scoping process, and planned scoping meetings. It should list the name and address of a DOE contact person. The DOE NEPA guidelines call for a public comment period of at least 20 days following publication of the NOI (DOE 1987).

3.1.2 Conduct Project Meeting

According to EPA (1988a), a meeting should be held at the beginning of project planning to involve key agency managers and contractor personnel in initial planning and identification of site-specific concerns. If the decision to prepare an EIS has

already been made, it is appropriate to conduct the project meeting as a NEPA scoping meeting. DOE now requires that at least one NEPA scoping meeting be held (Watkins 1990). This meeting should be open to the public, and its goals should be (1) to identify the significant issues related to the proposed remedial action (40 CFR §1501.7) and (2) to determine the scope of issues to be addressed in the RI/FS-EIS process. DOE should invite the participation of the EPA and other involved federal agencies, state and local regulatory officials, representatives of affected Indian tribes, RI/FS contractors, and interested members of the public. The intent to integrate CERCLA RI/FS requirements with NEPA requirements should be explained at this meeting and understood by all parties.

Additional NEPA scoping meetings may be necessary to ensure that interested parties have an opportunity to participate. For example, if the project meeting was held during a weekday, it may be appropriate to schedule an additional scoping meeting in the evening to make it easier for the public to participate. Similarly, it may be appropriate to hold meetings in more than one location to permit participation by residents near all potentially affected sites. Also, one or more NEPA scoping meetings are needed if the decision to prepare an EIS was made after the RI project meeting.

3.1.3 Conduct Community Interviews

Community interviews are a required part of the RI/FS process and constitute an important element in developing a community relations plan. The objectives of community interviews are to obtain information on the site's history, gain an understanding of the community's needs and concerns regarding the site, and learn how the community would like to be involved in the remedial response process. In the integrated RI/FS-EIS process, the interviews should also be viewed as a part of NEPA scoping. DOE, in consultation with EPA or the state, will decide the number and types of interviews to be conducted. According to EPA guidance, interviews may range from formal question-and-answer sessions requesting the opinions of many citizens to a few informal discussions in person or by telephone with selected well informed individuals who clearly represent the community. Results of community interviews should be made available to technical personnel, used in identifying issues and alternatives to be considered in the FS-EIS, and considered in developing the community relations plan. More information on community relations requirements during the RI/FS process is provided in EPA's RI/FS guidance (EPA 1988a) and CERCLA Community Relations Handbook (EPA 1988b).

3.1.4 Collect and Evaluate Existing Data

Existing data from the PA/SI and other sources should be collected as a starting point for the RI/FS-EIS process. These data can be used to characterize the hazardous waste sources, migration pathways, and human and environmental receptors as well as to compile a site description and history and determine data gaps. The purpose of this step is stated in EPA (1988a): "A thorough search of existing data should help avoid duplication of previous efforts and lead to a remedial investigation that is more focused and, therefore, more efficient in its expenditure of resources."

The broader scope of NEPA impacts analyses means that more information may have to be reviewed than would otherwise be collected during RI scoping. CEQ

regulations (40 CFR §1502.15) require that the EIS "succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration." The size of the "affected environment" addressed in an EIS is defined by the geographic extent of potential impacts, including indirect and cumulative effects, and usually extends beyond the site and potential exposure pathways that are normally the focus of an RI. Also, whereas the typical RI is concerned with the relationship of people with the environment to the extent necessary to support risk assessments, NEPA analysis may also require information to support analysis of socioeconomic impacts, effects on transportation systems, and other topics that fall under NEPA's broader definition of "environmental consequences" (see Sect. 2.3.3). Therefore, depending on the nature and magnitude of possible impacts on community and cultural resources, RI scoping for the integrated RI/FS-EIS process may need to include compilation and preliminary review of information on such topics as demographics, land use, community services, transportation, housing, and archeological and historical resources. Finally, if off-site disposal alternatives have been identified for consideration, available information on those sites and associated transportation routes should be obtained.

3.1.5 Develop Preliminary Remedial Alternatives

The identification of preliminary remedial alternatives will help ensure that information needed to evaluate these alternatives is collected during the RI. For CERCLA, the range of alternatives should include (1) a no-action alternative; (2) a range of those alternatives in which treatment significantly reduces the toxicity, mobility, or volume of the wastes; and (3) one or more alternatives that involve containment with little or no treatment (RI/FS Guidance). Under NEPA (see 40 CFR §1508.25), the alternatives that must be considered are (1) the no-action alternative and (2) other reasonable courses of action. Comments received during scoping should be considered in identifying preliminary alternatives. Development of alternatives in the integrated RI/FS-EIS process is discussed in more detail in Sect. 5.3.

3.1.6 Evaluate the Need for Treatability Studies

Evaluation of remedial alternatives that involve treatment or destruction technologies may require that treatability studies be performed. Needed studies can range from bench-scale materials testing to experiments at existing off-site treatment facilities to construction and operation of a pilot plant at the site. In the integrated NEPA-CERCLA process, treatability studies that themselves have potentially significant impacts or that may constrain the later selection of alternatives (e.g., those that involve construction of pilot plants) should be avoided or deferred until after completion of the RI/FS-EIS process. The CEQ regulations state that "agencies shall not commit resources prejudicing selection of alternatives before making a final decision" [40 CFR §1502.2(f)].

3.1.7 Identify ARARs and Required Environmental Reviews

The CERCLA RI/FS process requires that remedial responses adhere to all applicable or relevant and appropriate requirements (ARARs). NEPA has a parallel requirement, that is, that the NEPA process should be integrated with other applicable

environmental review and consultation requirements (40 CFR §1502.25). The EPA RI/FS guidance (EPA 1988a) recommends that potential ARARs be identified during RI scoping to help ensure that appropriate action alternatives are developed and that necessary field activities are planned. The integration of environmental reviews, as required by NEPA, is also facilitated by early identification of potential requirements.

Three categories of ARARs are identified in EPA CERCLA guidance: chemical-, location-, and action-specific ARARs. Chemical- and location-specific ARARs can be identified during scoping based on existing site data. Chemical-specific ARARs (e.g., maximum contaminant levels under the Safe Drinking Water Act) are usually health- or risk-based numerical standards. Location-specific ARARs are restrictions placed on the conduct of activities because they are in specific locations (e.g., requirements for management of floodplains and protection of wetlands). Action-specific ARARs are requirements for and limitations on particular treatment or disposal activities for hazardous substances. Possible action-specific ARARs may be identified during scoping, although in a very preliminary form, based on the remedial alternatives being considered.

Possible sources of ARARs and environmental review requirements include the following federal statutes (DOE 1987) and executive orders:

- Clean Air Act;
- Clean Water Act;
- Coastal Zone Management Act;
- Endangered Species Act;
- Fish and Wildlife Coordination Act;
- Wild and Scenic Rivers Act;
- National Historic Preservation Act;
- Section 13 of the Federal Non-nuclear Research and Development Act;
- Marine Protection, Research and Sanctuaries Act;
- Resource Conservation and Recovery Act;
- Toxic Substances Control Act;
- American Indian Religious Freedom Act;
- Executive Order 11988 (Floodplain Management); and
- Executive Order 11990 (Protection of Wetlands).

Any other permits, licenses, or entitlements that may be required to implement remedial action should be identified (40 CFR §1502.25).

3.1.8 Identify Additional Data Needs

A major element of RI scoping is identification of additional data that should be collected during the RI. For an integrated NEPA-CERCLA process, identification of information needs should consider not only the RI/FS objectives (EPA 1988a), but also the need for information to support NEPA analyses of environmental consequences, as discussed in Sect. 3.1.4. The provisions in the CEQ regulations regarding incomplete and unavailable information should also be considered. These provisions apply to assessment of potential environmental impacts when the information needed to assess these impacts is incomplete or unavailable. This may frequently be the case for CERCLA remedial actions, for example, when there are uncertainties concerning the

nature and distribution of contaminants or subsurface geological conditions or when there is concern about the potential impacts of a low-probability event (e.g., a tornado) on the integrity of a disposal system. The regulation concerning incomplete and unavailable information states as follows (40 CFR §1502.22):

(a) If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

(b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement: (1) A statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluate reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts which have catastrophic consequences, even if their probability of occurrence is low

In identifying additional data needs for an integrated RI/FS-EIS process, an effort should be made to ensure that all information called for in paragraph (a) of this regulation will be obtained. Also, consideration should be given to identifying investigations that may be needed to use or develop any needed "theoretical approaches or research methods" if some information is expected to be "unobtainable" in the context of the regulation.

Establishment of data quality objectives is included in this step of the RI scoping (EPA 1988a). As described by EPA (1988a), the purpose of this step is to identify the level of confidence required for each type of data to be collected in the RI. No formal data quality requirements exist under NEPA, so data quality objectives identified in this step will be dictated by CERCLA needs.

3.2 PROJECT PLANS

Project plans for the RI/FS process are documented in a Work Plan, a Health and Safety Plan, a Sampling and Analysis Plan (which includes a Field Sampling Plan and a Quality Assurance Program Plan), and a Community Relations Plan. The same set of project plans will be issued in an integrated NEPA-CERCLA process.

The work plan documents the decisions and evaluations made during scoping and defines the scope and objectives of the tasks to be performed in the RI and FS. Detailed descriptions of these tasks are provided in the Sampling and Analysis Plan (EPA 1988a). The introduction to the work plan should note that CERCLA RI/FS requirements are to be integrated with NEPA requirements during the remedial

response at the site. The DOE CERCLA/NEPA integration policy should then be discussed. The introduction should also indicate that the work described in the work plan also accommodates NEPA, and that it therefore differs from a typical CERCLA work plan. For example, as discussed in Sect. 3.1.4, the study area to be investigated may be more extensive than normal to conform with the NEPA definition of the affected environment, and topics of investigations may have to be expanded because of the broader scope of environmental consequences to be considered under NEPA.

The DOE NEPA procedures call for the preparation of an EIS implementation plan (DOE 1987). The purposes of this plan are to record the results of the scoping process and to provide guidance to DOE for the preparation of an EIS. In the integrated RI/FS-EIS process, the EIS implementation plan should be an appendix to the work plan. Contents of the EIS implementation plan are described by DOE (1987). Among the information called for are (1) identification of related environmental analysis, review and consultation requirements and (2) a schedule for integrating these requirements with the EIS schedule. For an integrated process, the EIS implementation plan should state that the NEPA EIS requirements are being integrated with the CERCLA RI/FS process and that an integrated set of documents will be produced. The sequence in which documents will be published or released for public comment should be explained here, because some modifications are needed to accommodate the differing requirements of the two processes (Sects. 2.3.7 and 2.3.8). Thus, the EIS implementation plan should indicate that the documents published for public comment at the conclusion of the RI/FS will be the RI report, a combined FS report and draft EIS, and a CERCLA proposed plan. Following public comment, the comments and responses to those comments (including any changes to the RI report, FS-EIS document or proposed plan) will be documented in the final EIS. The final EIS should also serve as the responsiveness summary for the RI/FS process. At least 30 days after the FR notice announcing the publication and filing of the EIS, a ROD can be issued.

The CERCLA health and safety and community relations plans do not appear to require modifications to meet NEPA requirements. The community relations plan should, however, reflect the sequence of documents noted above, and it should allow for a public comment period of at least 45 days for the FS-EIS document and proposed plan, as required under NEPA, rather than 30 days specified under CERCLA.

Project plans for DOE RI/FS processes and DOE EIS implementation plans require review and approval by DOE headquarters before they are implemented. The DOE Office of Environmental Guidance and Compliance (EH-23) is the lead headquarters office for reviewing project plans. EH-23 will coordinate reviews by other offices, including review of the EIS implementation plan by the Office of NEPA Project Assistance (EH-25). The schedule for review by DOE headquarters, EPA, and the state is given in Appendix B. Once the final project plans are approved, they should be placed in the administrative record for the site.

4. REMEDIAL INVESTIGATION REPORT

The RI report serves to document data collection and analysis in support of the FS-EIS. A draft RI report can be produced any time after the completion of the baseline risk assessment (see Sect. 2.2.4) and before the completion of the draft FS-EIS. As stated in EPA (1988a), however, "the draft RI report should not delay the initiation or execution of the FS."

The information in the RI will be incorporated by reference and summarized in the FS-EIS as a description of the "affected environment." CEQ regulations (40 CFR §1502.15) require that the EIS "describe the environment of the area(s) to be affected or created by the alternatives under consideration." Data collected and analyzed during the RI should provide sufficient information to develop a description of the "affected environment" if the broader scope of NEPA analysis has been taken in account in project planning (see Sects. 2.3.3 and 3.1.4).

Upon completion, the draft RI report should be sent to DOE's Office of the Deputy Assistant Secretary for Environment (EH-20). It will then be reviewed by the Offices of Environmental Guidance and Compliance (EH-23) and NEPA Project Assistance (EH-25). To facilitate review by these offices, EPA, and the state, the draft RI report can be submitted when the draft FS-EIS is submitted. The public may also be offered an opportunity to comment on the draft report. The schedule for review by DOE headquarters and supporting agencies is depicted in Appendix B. If the site is on the NPL, a copy of the draft RI report must be sent to the Agency for Toxic Substances and Disease Registry for its use in preparing a health assessment. When a final RI report is completed following response to agency comments, it should be placed into the administrative record for the site.

The discussion below describes suggested contents for an RI report that should meet the requirements of both CERCLA and NEPA. The report format generally follows EPA's RI/FS guidance (EPA 1988a), with modifications to accommodate NEPA requirements. The resulting report organization will comply with CEQ regulations, which allow some modifications to the format of an EIS to facilitate integration with other review processes (40 CFR §1502.10 and §1506.4). An outline for an RI report incorporating the recommendations of this section is found in Appendix A.

4.1 PREFATORY SECTIONS

The body of the RI report should be prefaced by a cover sheet as required for an EIS (40 CFR §1502.11). The cover sheet should include the following:

- identification of DOE as the lead agency and the EPA, state environmental regulatory agency, or other state or federal agencies as cooperating agencies for the EIS;
- the title of the proposed action that is the subject of the EIS and the state(s) and county(s) where the action will occur;
- the name, address, and telephone number of the DOE officials, including a designated EH-25 official, who can supply further information.

- a designation of the document as draft or final;
- a one-paragraph abstract of the document; and
- the date by which comments must be received.

A table of contents should be provided, as called for in an EIS (40 CFR §1502.10). This will facilitate review of the document.

The RI report should also contain an executive summary that summarizes the work conducted during the RI. Both the RI/FS guidance (EPA 1988a) and CEQ regulations (40 CFR §1502.10) require a summary. Accordingly, the RI executive summary does not have to be modified for NEPA.

4.2 INTRODUCTION

The introduction to the draft RI report (RI Sect. 1, Introduction) should contain three subsections. The first of these (RI Sect. 1.1, Purpose of the Report) should state the purpose of the RI report: to document the results of an investigation to characterize the nature and extent of contamination, contaminant migration, and human and environmental receptors at a certain site. This subsection must also fulfill the NEPA requirement for a statement of purpose and need. CEQ regulations (40 CFR §1502.13) state "the statement shall briefly specify the underlying purpose and need to which the agency [DOE] is responding in proposing the alternatives including the proposed action." In most cases, the purpose and need of an integrated NEPA-CERCLA process will be the need to respond to an uncontrolled release or potentially uncontrolled release of hazardous substances at the subject site.

The next subsection (RI Sect. 1.2, Site Background) should provide a description of the site and its history. Much of the necessary information should have been developed during RI scoping. The site description (RI Sect. 1.2.1) should be concise and should focus on important site features. Topics to be discussed might include (EPA 1988a) sources of hazardous substances, natural and man-made surface features, meteorology and air quality, surface water hydrology and quality, geology, soils and sediments, hydrogeology and groundwater quality, demography and land use, and ecology. The site history (RI Sect. 1.2.2) should emphasize past activities that created the conditions to be addressed under CERCLA, including commercial or industrial uses and disposal history. It should also note any earlier efforts to remediate the site and review developments leading to the site's current legal status (e.g., listing on the NPL or past NEPA documentation). RI Sect. 1.2.3 (Previous investigations) should review any previous on-site investigations, including applicable reference citations.

The final subsection of the introduction (RI Sect. 1.3, Report Organization) should briefly describe how the RI report is organized. It will be necessary to indicate that the standard RI report format has been modified because the CERCLA RI/FS process is being integrated with the NEPA process. DOE's policy on integration should be discussed. This subsection should identify the RI report sections that were modified to accommodate CERCLA/NEPA integration (see Appendix A). The NEPA requirements that mandate these modifications could be cited.

4.3 STUDY AREA INVESTIGATION

This section (RI Sect. 2) should describe field activities conducted during the RI and should summarize technical memoranda documenting these activities. The contents of this section are essentially as described in RI/FS guidance (EPA 1988a). Although RI Sect. 2.2 should summarize technical memoranda, EPA (1988a) notes that the actual memoranda may be included in an appendix.

4.4 CHARACTERISTICS OF THE STUDY AREA

According to EPA (1988a), this section (RI Sect. 3) should describe the results of field activities conducted to determine the physical characteristics of the site and potentially affected off-site areas. Subsections recommended by EPA (1988a) include surface features (i.e., natural and man-made topographic features), meteorology, surface water hydrology, geology, soils, hydrogeology, demography and land use, and ecology. Any investigations carried out to develop other information needed for a NEPA impacts assessment (e.g., observations of traffic conditions on highways serving the site) should be reported. To help achieve the NEPA objective of providing documentation that is useful to decision makers because it "is concise, clear and to the point" (40 CFR §1500.2), the text of this section should focus on information that is germane to the assessment of significant issues; where possible, compilations of data should be placed in appendices.

4.5 NATURE AND EXTENT OF CONTAMINATION

As directed by EPA (1988a), RI Sect. 4 should provide a discussion of the identity, distribution, and concentration of contaminants as well as natural chemical components at the site. EPA (1988a) recommends that this section be divided into subsections concerned with sources (e.g., lagoons, sludges, tanks), soils and vadose zone, groundwater, surface water and sediments, and air. In some instances, it may also be appropriate to include a section on contaminants in the biota. As with RI Sect. 3, the text should focus, where possible, on information that is germane to assessment of significant issues, and compilations of data should be placed in appendices.

4.6 CONTAMINANT FATE AND TRANSPORT

Section 5 of the RI report should describe potential routes of contaminant migration, discuss the estimated environmental persistence of any organic contaminants, and report the results of analyses of contaminant migration (EPA 1988a). If mathematical models were used to estimate or predict contaminant fate and transport, modeling methodologies should be identified (and described in an appendix if there is no published description that can be cited) in accordance with the requirements concerning the methodological and scientific integrity of NEPA analyses (40 CFR §1502.24).

4.7 BASELINE RISK ASSESSMENT

A baseline risk assessment is an important element of the RI. Its objective is to evaluate quantitatively the potential threats to human health and the environment in the absence of remedial action (EPA 1988a). These are the risks associated with the "no-action" alternative for the FS-EIS. Section 6 of the RI report should describe the conduct of the baseline risk assessment and present its results. If a separate report has been prepared to document the baseline risk assessment, Sect. 6 may simply cite the report and summarize its contents. Guidance for CERCLA baseline risk assessments has been issued by EPA (1989b, 1989c).

The baseline risk assessment forms a large part of the NEPA assessment of the no-action alternative, but the NEPA assessment of the no-action alternative includes elements that are not required in a CERCLA baseline risk assessment. Consideration of NEPA requirements is therefore needed in designing, conducting, and reporting the results of the baseline risk assessment.

One major difference between the NEPA assessment of no action and the CERCLA baseline risk assessment is that NEPA assessments usually involve projections of future conditions at the waste sites (e.g., a NEPA assessment might consider the implications of long-term physical deterioration of existing environmental controls and the risks involved in hypothetical future changes in land use), whereas the CERCLA baseline risk assessment considers only present-day conditions. For sites with radiological contamination (i.e., most DOE sites), assessment of radiological risks should be combined with the chemical risk assessment that is the focus of CERCLA guidance. To support NEPA analyses of cumulative impacts and to aid in comparing risks of alternatives with different levels of population exposure to contaminants, it may be necessary to supplement the CERCLA assessment of risks to maximally exposed individuals with assessments of population risks from radionuclides and other carcinogens. Ecological risks may also be of greater concern in the context of a NEPA assessment than under CERCLA alone. Guidance documents for ecological risk assessment by Warren-Hicks et al. (1989) and Barnthouse et al. (1986) are a useful supplement to the CERCLA guidance on this topic. Risk assessment documentation should meet the NEPA requirements for ensuring the methodological and scientific integrity of NEPA analyses (40 CFR §1502.24). DOE may choose not to include the results of additional assessments conducted for NEPA purposes in the baseline risk assessment or RI reports that are supplied to the Agency for Toxic Substances and Disease Registry, but these assessments should be completed at the same time as the baseline risk assessment.

4.8 SUMMARY AND CONCLUSIONS

Section 7 of the RI report (Summary and Conclusions) is prepared in accordance with EPA RI/FS guidance (EPA 1988a). It should summarize the nature and extent of contamination, contaminant fate and transport, and the results of the baseline risk assessment. It should also discuss data limitations, make recommendations for future work, and list remedial action objectives. This section also serves to summarize the description of the "affected environment" and the "no-action" alternative for NEPA.

4.9 OTHER SECTIONS

The CEQ regulations (40 CFR §1502.17) require that an EIS list the persons who were primarily responsible for preparing the EIS or significant background papers. Hence, a list of these people and their professional qualifications should be appended to the RI report. A list should be included of the agencies, organizations, and persons to whom copies of the report will be sent, as required in 40 CFR §1502.10.

Appendices to the RI report should be used to present in complete form technical information that was summarized in the text. Appendices might include technical memoranda on field activities, analytical data and QA/QC evaluation results, and details of methodologies used in the baseline risk assessment or contaminant transport modeling. Under NEPA, appendices are appropriate for reporting information that is not essential to understanding issues or conclusions but that is important for verification of the technical validity of analyses (see CEQ 1981). Judicious use of appendices improves the focus and accessibility of the main document.

5. FEASIBILITY STUDY-ENVIRONMENTAL IMPACT STATEMENT

This section describes the recommended format and content of an FS-EIS report. As with the RI report, the FS-EIS report format generally follows RI/FS guidance (EPA 1988a), with some modifications to accommodate NEPA requirements. The recommended organization will satisfy CEQ regulations, which allow the format of an EIS to be modified as long as the contents meet the requirements of the regulations (40 CFR §1502.10). An outline for an FS-EIS report incorporating the recommendations of this section is provided in Appendix A.

The FS-EIS can be written concurrently with the RI report (i.e., as necessary information becomes available) or after the RI report is completed. The completed draft FS-EIS should be sent to DOE's Office of the Deputy Assistant Secretary for Environment (EH-20). It will then be reviewed by the Offices of Environmental Guidance and Compliance (EH-23) and NEPA Project Assistance (EH-25). The schedule for review by DOE headquarters and supporting agencies is depicted in Appendix B. Following DOE approval, the RI report, combined FS report and draft EIS, and proposed plan are published for public review and comment. In accordance with NEPA regulations, the public comment period must be at least 45 days from the publication in the FR of a notice of availability of the FS-EIS.

Following public comment, the comments and responses to comments (including any changes to the RI report, FS, or proposed plan) should be documented in the final EIS, in accordance with CEQ regulations (40 CFR §1503.4). The final EIS will also serve as a responsiveness summary for purposes of CERCLA. The combined FS and draft EIS, final EIS, and proposed plan should all be placed in the administrative record for the site. At least 30 days after EPA publishes an FR notice announcing the publication and filing of the EIS, a ROD can be issued. Because the ROD is issued under both NEPA and CERCLA, its contents must satisfy the requirements of both laws, as outlined in Sects. 2.1.6 and 2.2.5. As noted in Sect. 2.3.8, the ROD must be approved by EPA before it is issued.

5.1 PREFATORY MATERIAL.

The body of the FS-EIS should be prefaced by a cover sheet, summary, and table of contents. The content of these elements is the same as outlined for the RI report (Sect. 4.1), with the following two exceptions. First, the cover sheet should include the date by which comments on the draft FS-EIS should be received (40 CFR §1502.11). Second, to conform with NEPA requirements (40 CFR §1502.12), the summary should focus on the major conclusions of the FS-EIS, areas of controversy (including issues raised by agencies and the public during scoping), and the issues to be resolved (including the choice among alternatives). The CEQ regulations recommend that the summary not exceed 15 pages.

5.2 INTRODUCTION

The introductory section of the FS-EIS (FS-EIS Sect. 1) generally will consist of two major sections, "Purpose and Organization of the Report" and "Background Information."

5.2.1 Purpose and Organization of the FS-EIS

FS-EIS Sect. 1.1 should provide a statement of purpose, explain how the document responds to the requirements of both CERCLA and NEPA, and guide the reader through the document. The statement of purpose should indicate that the FS-EIS was prepared to document the development, screening, analysis, and selection of an appropriate remedial action for the site. As in the RI report, this subsection must also fulfill the NEPA requirement for a statement of "the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 CFR §1502.13). In most cases, the purpose and need of an FS-EIS will be the need to respond to an uncontrolled release or potentially uncontrolled release of hazardous substances at the subject site.

This subsection should include a brief discussion of the report's organization. It will be necessary to indicate that the traditional formats for the FS report and EIS have been modified because the RI/FS and NEPA processes are being integrated. DOE's policy on integration should be explained here. This subsection should specifically identify those FS sections that have been modified to accommodate NEPA-CERCLA integration (see Appendix A). For example, it may be necessary to point out that the "background information" section outlined in EPA's suggested FS report format will also serve as the description of the affected environment for purposes of the EIS. Not only should the dual purpose of the "background information" section be explained, but there should be an acknowledgment that the "affected environment" section precedes the "description of alternatives," reversing the order set forth in the CEQ regulations at 40 CFR §1502.10.

To assist in demonstrating compliance with NEPA, this part of the document should identify any other existing or planned NEPA documents (e.g., a broad programmatic EIS covering a program of remedial actions) and CERCLA actions (e.g., interim removal actions) associated with the FS-EIS and explain their relationship to the FS-EIS. This information is particularly important if the FS-EIS is tiered to a programmatic EIS prepared earlier.

5.2.2 Background Information

The "background information" section of the FS-EIS (FS-EIS Sect. 1.2) can satisfy both the FS requirement for background information on the site and the NEPA requirement for an "affected environment" section in an EIS. As recommended by EPA (1988a), the background information contained in the RI report should be referenced here and Sects. 3 through 6 of the RI report (i.e., characteristics of the site, nature and extent of contamination, contaminant fate and transport, and baseline risk assessment) should be summarized. The parallel element of an EIS is a description of the affected environment, which is required to "succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration" (40 CFR §1502.15). As

discussed in Sect. 3.1.4, the geographic area of the NEPA affected environment may be broader than that normally considered in an RI/FS and NEPA may require consideration of more topics than would normally be included under CERCLA. The CEQ regulations (40 CFR §1502.15) also encourage agencies to provide concise and focused descriptions, "no longer than . . . necessary to understand the effects of the alternatives" and commensurate with the importance of the impacts. To "concentrate effort on important issues," agencies are encouraged to summarize, consolidate, or reference "less important material." In integrated NEPA-CERCLA documentation, portions of the RI can be designated to serve as the "affected environment" section of the EIS if they meet these requirements. If the RI report lacks the focus called for by these NEPA requirements, however, FS-EIS Sect. 1.2 should be written to serve as the "affected environment" section.

5.3 DEVELOPMENT OF ALTERNATIVES

5.3.1 Introduction

The CERCLA approach to developing alternatives must be slightly modified in the integrated NEPA-CERCLA process so that it also meets the requirements of NEPA (see Sect. 2.3.3). Also, although the broad outline of the CERCLA FS format should be followed in documenting the identification of alternatives in the FS-EIS, some adjustments are recommended to ensure that the document meets NEPA requirements.

Under CERCLA, the identification and evaluation of alternatives is a phased process that is described in three sections of the FS: Identification and Screening of Technologies, Development and Screening of Alternatives, and Detailed Analysis of Alternatives. Under NEPA, the identification and comparison of alternatives is done just once and is addressed in a single section on alternatives. The CEQ regulation concerning the alternatives section (40 CFR §1502.14) calls it "the heart of the [EIS]." This regulation states that the alternatives section should draw on the information and analyses in the affected environment and environmental consequences sections (the analogous parts of an FS-EIS are Sect. 1.2, Background Information, and Sect. 4.2, Individual Analysis of Alternatives) to ". . . present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." The regulation further states that in this section, agencies should:

- (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
- (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
- (c) Include reasonable alternatives not within the jurisdiction of the lead agency.
- (d) Include the alternative of no action.
- (e) Identify the agency's preferred alternative or alternatives . . .

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives."

The recommendations below are intended to help ensure that these requirements are met.

5.3.2 Identification and Screening of Technologies

In accordance with CERCLA guidance (EPA 1988a) the "Identification and Screening of Technologies" section of the FS-EIS (FS-EIS Sect. 2) initiates the development of an "appropriate range" of waste management alternatives that are analyzed in FS-EIS Sect. 4 (Detailed Analysis of Alternatives). The purpose of FS-EIS Sect. 2 is to identify those remedial action technologies and process options that may be most appropriate for the given site and that therefore should be included in developing waste management alternatives for detailed analysis. Three main topics are covered: (1) establishment of remedial action objectives (FS-EIS Sect. 2.2), (2) development of general response actions (FS-EIS Sect. 2.3), and (3) identification and screening of technology types and process options (FS-EIS Sect. 2.4).

The establishment of remedial action objectives includes the identification of the contaminants of concern and their ARARs, likely exposure routes, likely receptors, and allowable exposures based on ARARs and the baseline risk assessment. General guidance for establishing remedial action objectives is given by EPA (1988a). Much of the information called for in this section of the FS-EIS will have been contained in the RI report and reviewed in Sect. 1 of the FS-EIS, so it need not be repeated here. Because the NEPA concern with assessment of environmental consequences is not limited to consequences that are regulated under current law, the listing in this section of contaminants of interest should not be limited to those contaminants for which ARARs exist. Also, when integrating CERCLA with NEPA it is especially desirable to specify risk-based goals as ranges of values (e.g., 10^{-4} to 10^{-7}) rather than as single values so that alternatives offering distinctly different levels of protection (and thus representing a broad range of "reasonable alternatives") can be carried through to the detailed analysis phase.

EPA (1988a) calls for FS-EIS Sect. 2.3 to (1) identify "general response actions" (e.g., treatment, containment, excavation, institutional controls) that will satisfy remedial action objectives for each medium of concern at the site and (2) present a preliminary identification of the areas and volumes of material to which these actions may need to be applied. To ensure that input received during scoping is adequately considered for the purposes of NEPA, concerns and suggestions expressed during scoping should be added to the list of considerations in Sect. 4.2 of EPA (1988a) as factors to be considered in identifying general response actions.

FS-EIS Sect. 2.4, Identification and Screening of Technology Types and Process Options, documents a two-stage screening process outlined by EPA (1988a). The first stage in this process is to identify and screen technology types under each general response action (e.g., chemical treatment is a technology type under the general response action called treatment). Technology types are screened on the basis of technical implementability at the given site. The results of this stage are presented in FS-EIS Sect. 2.4.1, Identification and Screening of Technologies.

The second stage of this screening is identification and screening of process options under each technology type (e.g., oxidation-reduction under chemical treatment). The results of this are presented in FS-EIS Sect. 2.4.2, Evaluation of Technologies and Selection of Representative Technologies. The RI/FS guidance (EPA 1988a) indicates that process options should be screened according to the criteria of effectiveness, implementability, and relative cost, with the greatest emphasis placed on effectiveness. To ensure that an appropriate range of alternatives is developed for NEPA analysis, potential environmental consequences should also be considered in this screening step. For example, air stripping may be an effective method for treating contaminated water. However, because it can release contaminants to the atmosphere, it should not be the only physicochemical treatment option carried to the next stage of analysis. Instead, if there is another effective process option that does not involve air releases, it should also be carried to the next stage. Another consideration in this screening step may be the desirability of considering one or more innovative technologies in the detailed analysis. To comply with the requirements of 40 CFR §1502.24 concerning the scientific integrity of EISs, statements about the effectiveness and reliability of various process options should be amply supported by citations to appropriate technical references. If treatability studies have been performed to evaluate the effectiveness or implementability of one or more specific process options, their results should be reviewed or cited in support of the comparative evaluation of process options.

5.3.3 Identification of Alternatives for Analysis

In Sect. 3 of the FS-EIS, Development of Alternatives, the media-specific technologies that survived the initial screening in the previous section are combined into alternative remedial actions representing "a range of treatment and containment combinations, as appropriate" (EPA 1988a). This section should explain the rationale for combining technologies for different media into comprehensive alternatives, and it should provide brief overview descriptions of the alternatives to be considered in the detailed analysis of alternatives.

To comply with NEPA, in addition to the remedial action alternatives, the "no-action" alternative (i.e., the continuation of baseline conditions) must receive full consideration in the detailed analysis; it cannot be dismissed early in the process. In many cases the NEPA requirement to consider all "reasonable" alternatives will also require identification of a "limited-action" alternative, in which such measures as site access restrictions, institutional controls, environmental monitoring, and provision of alternative water supplies are used to comply with regulations and minimize exposures but in which no actions are taken to physically contain, remove, or treat the source or contaminated media.

To avoid having to undertake detailed analysis of an excessively large number of alternatives, EPA (1988a) recommends a preliminary screening of alternatives using criteria of effectiveness, implementability, and cost. Because this screening comes after several rounds of screening and because it may appear that some valid alternatives are dismissed arbitrarily (particularly if they are dismissed on the basis of cost), persons familiar with the NEPA process are likely to view this screening as incompatible with the NEPA directive to "rigorously explore and objectively evaluate all reasonable alternatives." Accordingly, this final screening step should be avoided in an FS-EIS. Instead, to prevent the number of alternatives from becoming unwieldy, two or more

similar options should be combined into one alternative with two or more subalternatives. For example, three alternatives for remediation of a waste site in which the groundwater is contaminated all might involve (1) capping the waste, (2) pumping groundwater, (3) treating the groundwater, and (4) reinjecting the treated effluent. The only difference among alternatives might be the method of groundwater treatment (e.g., air stripping, ion exchange, and an experimental microbial treatment technology). Because the consequences of these three alternatives would be the same in most respects, it would be convenient to treat them as one alternative having three subalternatives.

5.4 DETAILED ANALYSIS OF ALTERNATIVES

5.4.1 Introduction

Section 4 of the FS-EIS, Detailed Analysis of Alternatives, contains the detailed analysis that is required of a CERCLA FS, the discussion of environmental consequences that is required in an EIS (40 CFR §1502.16), and a comparative analysis of alternatives that meets the requirements of both CERCLA and NEPA. This section may be characterized as the "heart" of the FS-EIS.

The EPA RI/FS guidance (EPA 1988a) calls for an introductory section (FS-EIS Sect. 4.1), which should identify the requirements to which this section responds and outline the organization of the remainder of the section. The nine CERCLA evaluation criteria, the requirements of 40 CFR §1502.16 for the environmental consequences section of an EIS, and the requirements of 40 CFR §1502.14 for analysis of alternatives should be cited or reviewed here.

5.4.2 Individual Analysis of Alternatives

The first step in the detailed analysis of alternatives is an individual analysis of alternatives, presented in FS-EIS Sect. 4.2. Section 4.2 should be divided into parts that address each of the individual alternatives identified in FS-EIS Sect. 3. Each of these parts is further divided into "Description" and "Evaluation" subsections (see Appendix A).

5.4.2.1 Description of alternative

In the "Description" subsection, the alternative should be described in sufficient detail to support its assessment. Whereas some of the quantitative values reported in these descriptions are measured quantities, many of the numerical values reported as a basis for analyzing costs, effluent volumes, etc., are estimates or design assumptions; assumptions and estimates should be clearly identified as such. Much of the information required to describe various alternatives will have been reported in earlier sections of the FS-EIS or the RI report and need not be repeated here. Maps, tables summarizing important features, and illustrations of design concepts may be especially useful in describing alternatives.

5.4.2.2 Evaluation of alternative

The "Evaluation" subsections must respond to both CERCLA and NEPA requirements and should provide decision makers with enough information to compare alternatives in order to select an appropriate remedial action. Under CERCLA, each alternative must be evaluated against nine decision criteria, listed in Sect. 2.2.4. EPA (1988a) indicates that the first seven of the nine criteria should be evaluated in the RI/FS. Analysis using the last two criteria (i.e., state acceptance and community acceptance) is to be deferred until the public has had the opportunity to review and comment on the FS-EIS, and it is presented in the responsiveness survey. NEPA, on the other hand, does not set criteria for evaluation or acceptance of alternatives but calls for an objective analysis of environmental effects, as broadly defined in the CEQ regulations (see Sect. 2.3.3), as well as measures that might be taken to mitigate adverse environmental effects (40 CFR §1502.16).

To simultaneously satisfy both CERCLA and NEPA requirements, each evaluation subsection should begin with an objective discussion of those observations, findings, and results of analyses that characterize the projected environmental consequences of the subject alternative and that are required to reach findings on the CERCLA criteria. (Topics to be covered in this discussion are described in the following.) Evaluations with respect to the CERCLA criteria should be presented next. This organizational scheme should satisfy both sets of requirements with a minimum of repetition. It may be modified as appropriate to accommodate site-specific situations.

Projected effectiveness and permanence of remedial measures. The first topic of discussion in the objective analysis portion of the evaluation section should be "projected effectiveness and permanence of remedial measures." Although this topic heading is similar to one of the CERCLA criteria, the content will be more inclusive because this also forms part of the NEPA analysis of environmental consequences. The purpose of this discussion is to describe the projected results of a remedial action alternative (or projected future changes to site conditions under the no-action alternative) and provide the basis for health risk projections and other analyses of long-term environmental consequences to be included in later discussions. In addition, this discussion should contain the information and analysis necessary to support an assessment with respect to the "permanence" element of the CERCLA criterion that deals with "long-term effectiveness and permanence."

This section should characterize the projected results of the remedial action alternative in terms of the time required to complete the action, site and vicinity conditions at the conclusion of the action (or, if appropriate, after individual components of the action are completed), and it should review available information on the probable long-term effectiveness of the remedial measures. Information presented should include projections of residual contaminant concentrations in various environmental media at the conclusion of the proposed action, identification of the type and quantity of treatment residuals that will remain following treatment, an assessment of the likelihood that the technologies will meet required process efficiencies or performance specifications, and assessments of factors related to the probable longevity of the remedial measures (e.g., uncertainties associated with the stability of covers and other barriers and requirements for long-term monitoring and extended operation and maintenance activities).

Short-term effectiveness. The next topic of discussion is "short-term effectiveness." This section should contain the information required to evaluate the remedial action alternative against the CERCLA "short-term effectiveness" criterion, as outlined in Sect. 6.2.3.5 of EPA (1988a). To comply with NEPA, however, additional topics must be addressed. Topics to discuss include the projected magnitude and concentration of any environmental effluents during remedial action (e.g., incinerator emissions, fugitive dust emissions associated with earth-moving activities, increased radon emissions caused by short-term exposure of radioactive wastes), projected exposures and health risks to project workers and members of the public as a result of these emissions, and beneficial and adverse environmental impacts of construction and remediation activities (e.g., impacts of increased sedimentation on water quality and aquatic habitats, transportation system impacts, socioeconomic impacts to the community, and short-term loss of ecological habitat). In accordance with 40 CFR §1502.16, indirect effects and cumulative impacts must be included. Measures that could be taken to mitigate adverse impacts and their likely effectiveness should be discussed here. In this and other discussions of impacts, impacts should be discussed in proportion to their significance (40 CFR §1502.2).

Long-term consequences. "Long-term consequences for human health and the environment" should be the third topic in the objective analysis of each alternative. A major element of this discussion is an evaluation of risk to human health that will exist at the conclusion of remedial-action activities, based on the information previously presented on the projected effectiveness of the remedial measures. In most cases, a quantitative risk assessment, based on the same premises as the baseline risk assessment, should be presented here. Other long-term environmental consequences should be identified and assessed here, too. In identifying long-term consequences from CERCLA actions, attention should be paid to indirect effects, cumulative impacts, and the other considerations listed in 40 CFR §1502.16. A particular concern for many CERCLA actions is the "irreversible and irretrievable commitments of resources" associated with alternatives that involve permanent dedication of land areas for waste management use.

Evaluation against CERCLA criteria. Following the discussion of the objective analyses of the three topics outlined above, the alternative should be analyzed with respect to the first seven of the nine CERCLA evaluation criteria (Sect. 2.2.4). The information needed to assess several of the criteria should be contained in the objective analysis portion of the evaluation section; analyses of implementability and cost will normally appear only in the evaluation against the CERCLA criteria.

Avoiding duplication and ensuring scientific integrity. Some of the information required in the evaluation subsections can be found in other portions of the FS-EIS, the RI report, or other documents. To avoid duplication, the reader should be directed to other portions of the FS-EIS as appropriate, and some information may be incorporated by reference to other documents. For example, much of the information needed in evaluating the no-action alternative will be found in the RI and baseline risk assessment reports, although it may be necessary to report additional analyses to meet NEPA requirements (see Sect. 4.7).

In accordance with the requirements of 40 CFR §1502.24 concerning methodology and scientific accuracy, the methodologies used in analyses reported here must be identified and references must be given for any scientific or other sources relied upon for conclusions. The "Case Example of Detailed Analysis" in Appendix F of the EPA

(1988a) would not meet this NEPA requirement. Technical details concerning the methodologies (e.g., descriptions of data input to mathematical models and discussions of the basis for selecting values for assumed input parameters) may be placed in appendices to the FS-EIS.

5.4.3 Comparative Analysis of Alternatives

Section 4.3 of the FS-EIS is a comparative analysis of alternatives. This section responds to requirements of both CERCLA and NEPA that mandate a comparison of alternatives. Alternatives should be compared with respect to each of the seven CERCLA evaluation criteria noted previously. Review and comparison of environmental consequences identified in the detailed analyses of the individual alternatives should be included in discussions of criteria for overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, and short-term effectiveness. Although the review and comparison of environmental consequences will be included in discussions of CERCLA criteria, its scope should correspond to the broader definition of environmental consequences under NEPA. To ensure compliance with NEPA, the review of environmental consequences should not be limited to statements like this one from the RI/FS guidance: "All of the alternatives, except no action, provide adequate protection of human health and the environment" (Appendix F of EPA 1988a). Instead, the environmental consequences associated with specific alternatives, as discussed in the individual analyses of alternatives, should be identified and compared. For example, if different alternatives lead to different residual health risk levels that all meet remedial action objectives, the health risk levels for the individual alternatives should be reviewed and compared. Similarly, if all remedial action alternatives have a particular impact in common (e.g., loss of a small area of woodland), this impact should be noted in the comparative discussion. As with other discussions mandated by NEPA, the attention given to an impact in this section should be commensurate with its significance.

A table or tables may be an effective mechanism for presenting the comparisons made in the comparative analysis section of the FS-EIS. Appendix F of the EPA's RI/FS guidance (EPA 1988a) contains a good example of such a table.

5.5 OTHER SECTIONS

CEQ regulations (40 CFR §1502.17) require that the EIS include a list of the persons who were primarily responsible for preparing the EIS or significant background papers. Hence, a section that lists these people and their professional qualifications should be included in the FS-EIS. CEQ (1981) offers some useful guidance on what should be included in this list. Copies of correspondence with other agencies and organizations should be provided to document the environmental review and consultation called for in 40 CFR §1502.25. There should also be a list of the agencies, organizations and individuals to whom copies of the document will be sent, as required in 40 CFR §1502.10. Appendices to the FS-EIS should be used to present in complete form technical information that was summarized in the text.

6. PROBLEMS IN INTEGRATION

Legal questions and practical problems may arise in integrating CERCLA and NEPA that are not addressed by the recommendations presented in Sects. 3 through 5. This section identifies a few such problems and suggests some possible answers and solutions.

6.1 APPLICABILITY OF NEPA TO CERCLA REMEDIAL ACTIONS

In spite of the DOE Order directing integration of NEPA and CERCLA, the applicability of NEPA to CERCLA remedial actions may be questioned on legal grounds. For example, a former Acting U.S. Assistant Attorney General has suggested that federal agencies should not be required to comply with NEPA when carrying out CERCLA responsibilities because Congress did not intend for NEPA to apply. Reasons for this interpretation include the following arguments (D. A. Carr, U.S. Department of Justice, Land and Natural Resources Division, Washington, D.C., official communication to D. Bear, March 6, 1989): (1) NEPA is not one of the statutes included by Congress in the list of federal substantive requirements that apply to CERCLA cleanups; (2) Congress expressly rejected proposed amendments that would have applied state NEPA-like procedures to CERCLA actions; (3) CERCLA §121 expressly assigns authority for CERCLA decision making to the President, and it is well settled that NEPA does not apply to presidential decision making; (4) the specific public participation requirements under CERCLA "render compliance with the public participation requirements of NEPA superfluous"; (5) by requiring "consideration of alternatives other than those based on health and environmental cleanup standards [NEPA] could well run contrary to CERCLA's goals"; (6) because "logic dictates that an EIS would have to be prepared following selection of the proposed remedy in order to effectively evaluate the impacts of the proposed action," NEPA implementation would result in failure to meet a statutory requirement to initiate on-site construction within 15 months of completing an RI/FS for a federal site; and (7) judicial review of the adequacy of an EIS would be contrary to the CERCLA statutory constraints on judicial review. Another argument is that the CERCLA RI/FS process is "functionally equivalent" to NEPA, making NEPA implementation superfluous.

The CEQ is expected to issue formal guidance on these legal questions. Informally, however, CEQ staff have rejected all of the arguments outlined here. With respect to the first of Carr's arguments, CEQ Chief Counsel Dinah Bear (1989) has noted that other federal statutes generally apply unless they are specifically excluded and that omission from the CERCLA list of substantive requirements is not meaningful because NEPA is not a substantive law, but a procedural law. With respect to the second argument enumerated above, she noted that Congressional rejection of state NEPA-like procedures has to do with federal-state relations and is not a rejection of the federal NEPA. In response to the third argument, she notes that many other presidential responsibilities that are actually carried out by executive branch agencies are subject to NEPA. The analysis and recommendations presented earlier in the present document are in opposition to arguments 4 through 6 in the preceding; we believe that

NEPA and CERCLA can be carried out concurrently and that public participation activities can be integrated successfully. Furthermore, the possible need to consider alternatives other than those required by CERCLA hardly mandates selection of those alternatives. With respect to the argument about judicial review, we have noted (Sect. 2.3.9) that the CERCLA constraints on judicial review are expected to limit review under NEPA. Furthermore, CEQ does not expect this to interfere with NEPA implementation (Carl Bausch, personal communication to F. E. Sharples, August 14, 1989). Finally, it is generally held that functional equivalency under NEPA applies only for federal agencies such as EPA whose mission is protection and enhancement of the environment, so that the CERCLA RI/FS process is not functionally equivalent to the NEPA process when it is carried out by the DOE.

6.2 APPLICABILITY OF RI/FS PROCESS TO NON-NPL SITES

Another question is whether the CERCLA RI/FS process, and thus integration of the NEPA and CERCLA processes, is required for sites that are not listed on the NPL. CERCLA regulations do not require that the RI/FS process be followed at such sites. DOE may, however, adopt a policy that would impose such a requirement. In a decision memorandum issued on March 14, 1989, the DOE Environmental Guidance Division (EH-231) recommended that all future DOE remedial actions "follow the RI/FS process at both NPL and non-NPL sites unless there are signed negotiated agreements, permits, or other forms of concurrence between all parties to pursue cleanups under authorities other than CERCLA, or by a specified process other than the RI/FS." If this recommendation is adopted, then the guidance provided in this document would apply to (1) all remedial actions under CERCLA, (2) any remedial action covered by another statutory authority (e.g., RCRA) for which no agreement or permit exists as outlined in the DOE decision memorandum, and (3) any remedial action not covered by any statutory authority and for which no agreement or permit exists. NEPA applies to federal agency remedial actions that do not follow the RI/FS process, and site personnel must evaluate how they will implement NEPA in any alternative remedial-action decision-making process.

6.3 SUBJECT AND TIMING OF NEPA ANALYSIS

As discussed in Sect. 2.3.4, the timing of the RI/FS process and the usual practice of separating complex remedial actions into several operable units under CERCLA may be inconsistent with NEPA's requirements to implement NEPA at the earliest possible time and to evaluate connected actions together.

The NEPA approach of tiering may be applicable to resolution of these problems. The CEQ regulations on tiering (40 CFR §1502.20) state:

Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues

discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action.

Additional CEQ guidance on tiering can be found in CEQ (1981) and Hill (1983).

A tiered approach to NEPA implementation for a complex CERCLA site would involve preparation of a broad site-wide or programmatic EIS evaluating alternative strategies for remediation over the entire site. This EIS should identify individual operable units, the sequencing of component actions, and basic decisions on overall approaches and evaluation criteria. To the extent possible, the cumulative impacts of taking action at the several operable units should be assessed. This EIS would be required to respond only to NEPA requirements. Decisions on individual operable units would then be addressed by separate NEPA-CERCLA documents (which might include Engineering Evaluation/Cost Analyses or RI/FS-EAs as well as RI/FS-EISs) tiered to the broader document. The NEPA-CERCLA document for each operable unit would identify and evaluate specific treatment technologies and process options applicable to that unit. In many instances, adoption of a tiered approach to NEPA implementation will permit a lower level of NEPA documentation (e.g., an EA instead of an EIS) for individual operable units than might otherwise be required. The amendments to the DOE NEPA guidelines proposed on April 6, 1990 (55 FR 13064) would classify most CERCLA and RCRA removal actions and site characterization activities as categorical exclusions under NEPA, so a tiered approach to NEPA implementation need not prevent emergency removal actions or initiation of RI activities prior to completion of the site-wide or programmatic EIS.

6.4 FEDERAL FACILITY AGREEMENTS

Requirements and schedules for CERCLA compliance at DOE facilities are spelled out in Federal Facility Agreements between EPA, DOE, and affected states. NEPA is not addressed in existing agreements or in the existing model provisions for Federal Facilities Agreements under CERCLA (Porter 1988). Newly negotiated agreements should reflect (and existing agreements may need to be modified to reflect) DOE's intent to integrate NEPA and CERCLA. Also, although integration of NEPA and CERCLA requirements should not significantly affect DOE's ability to meet compliance deadlines, schedules contained in the agreements may require minor modifications to accommodate NEPA compliance. Schedule modifications might be needed, for example, to accommodate NEPA tiering or to allow time for NEPA-related reviews within DOE, by the public, and by other federal agencies.

6.5 NEED FOR AN INTEGRATED NEPA-CERCLA TEAM

Section 2.3 outlines some of the differences between the NEPA and CERCLA processes. These differences are not limited to explicit requirements imposed by the regulations or formal guidance, but also include rather subtle differences in such areas as the meanings of terms and the way information is presented. These differences are pervasive; it is therefore virtually impossible to provide comprehensive guidance on the

integrated process for use by persons who are experienced with only one of the processes. Furthermore, there are very few professionals having sufficient experience in both processes to guide a successful integrated process. To help ensure that the integrated process and resulting documentation meet the expectations that apply to both processes, the project team that plans and conducts the integrated NEPA-CERCLA process and produces the resulting documentation should include individuals who are familiar with NEPA as well as individuals who are familiar with CERCLA. By sharing information and by reviewing draft materials prepared by other team members, such an integrated team should be able to prevent many of the potential compliance problems that arise from subtle differences between NEPA and CERCLA.

7. REFERENCES

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APPENDIX A
ANNOTATED OUTLINES FOR NEPA-CERCLA DOCUMENTS

Table A.1 Outline for RI Report in an integrated RI/FS-EIS process^a

RI Report Section ^b	Comments
Cover Sheet [*]	<ul style="list-style-type: none"> 40 CFR §1502.11 calls for a cover sheet.
Table of Contents [*]	<ul style="list-style-type: none"> 40 CFR §1502.10 calls for a table of contents.
Executive Summary	
<ol style="list-style-type: none"> 1. Introduction <ol style="list-style-type: none"> 1.1 Purpose of the Report 1.2 Site Background <ol style="list-style-type: none"> 1.2.1 Site description 1.2.2 Site history 1.2.3 Previous investigations 1.3 Report Organization 	<ul style="list-style-type: none"> 40 CFR §1502.13 requires that an EIS briefly "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." This statement of purpose and need should be included in Sect. 1.1. Sect. 1.3 should explicitly recognize and discuss DOE's NEPA-CERCLA integration policy. Those sections of the RI report that were added or modified to satisfy NEPA requirements should be identified in this section.
<ol style="list-style-type: none"> 2. Study Area Investigation <ol style="list-style-type: none"> 2.1 Field activities <ol style="list-style-type: none"> 2.1.1 Surface features 2.1.2 Contaminant source investigations 2.1.3 Meteorological investigations 2.1.4 Surface-water and sediment investigations 2.1.5 Geological investigations 2.1.6 Soil and vadose zone investigations 2.1.7 Groundwater investigations 2.1.8 Human population surveys 2.1.9 Ecological investigations 2.2 Technical memoranda documenting field activities 	<ul style="list-style-type: none"> The study area should be defined to include any portions of the NEPA "affected environment" that lie outside the usual RI study area. The size of the affected environment addressed in an EIS is determined by the geographic extent of impacts, including direct, indirect, and cumulative impacts. Investigations of such topics as land use, community services, and archeological and historic resources may be required to support NEPA analyses of environmental consequences. Only those topics for which site investigations were conducted need to be included in Sect. 2.

^aModified from a draft outline prepared by the DOE Environmental Guidance Division (EH-231).

^bSection numbers and names correspond to EPA's (1988a) recommended RI format except as otherwise noted. Asterisk denotes a format modification made to satisfy NEPA requirements.

Table A.1 (continued)

RI Report Section	Comments
3. Physical Characteristics of the Study Area 3.1 Results of field activities 3.1.1 Surface features 3.1.2 Meteorology 3.1.3 Surface-water hydrology 3.1.4 Geology 3.1.5 Soils 3.1.6 Hydrogeology 3.1.7 Demography and land use 3.1.8 Ecology 3.1.9 Cultural resources*	<ul style="list-style-type: none"> ● This section helps to describe the affected environment for NEPA. ● Only those topics for which site investigations were conducted need to be included in Sect. 3.
4. Nature and Extent of Contamination 4.1 Site Characterization Results 4.1.1 Sources 4.1.2 Soils and vadose zone 4.1.3 Groundwater 4.1.4 Surface water and sediments 4.1.5 Air	<ul style="list-style-type: none"> ● Information in this section supports the analysis of the no-action alternative, as well as the description of the affected environment. ● This section should report information on contaminants and natural chemical components in the environmental media investigated during the RI.
5. Contaminant Fate and Transport 5.1 Potential Routes of Migration 5.2 Contaminant Persistence 5.2.1 Estimated persistence in the study area environment 5.2.2 Physical, chemical, or biological factors affecting persistence 5.3 Contaminant Migration 5.3.1 Factors affecting contaminant migration in media of interest 5.3.2 Modeling methods and results (if applicable)	<ul style="list-style-type: none"> ● Information and analysis in this section support the baseline risk assessment and the evaluation of the no-action alternative. ● Appropriate reference citations should be provided in support of the persistence and mobility data used in the analyses presented in Sect. 5. ● Methods used in the analyses presented in this section should be documented or supported by appropriate reference citations.

Table A.1 (continued)

RI Report Section	Comments
6. Baseline Risk Assessment 6.1 Human Health Evaluation 6.1.1 Exposure assessment 6.1.2 Toxicity assessment 6.1.3 Risk characterization 6.2 Environmental Evaluation	<ul style="list-style-type: none"> The CERCLA baseline risk assessment forms a large part of the NEPA assessment of the no-action alternative, but the NEPA assessment may include additional elements. For example, NEPA assessment may require analysis of risks associated with projected future conditions at the site and (to support comparison of alternatives) estimates of population risks from radionuclides and other carcinogens.
7. Summary and Conclusions 7.1 Summary 7.1.1 Nature and extent of contamination 7.1.2 Fate and transport 7.1.3 Risk assessment 7.2 Conclusions 7.2.1 Data limitations and recommendations for future work 7.2.2 Recommended remedial action objectives	
List of Preparers* Distribution of RI/FS-EIS*	<ul style="list-style-type: none"> 40 CFR §1502.17 requires the EIS to include a list of the persons who prepared the document or significant background papers, with their professional qualifications. 40 CFR §1502.10 calls for a list of the agencies, organizations, and individuals to whom copies of the document will be sent.
Appendices A. Technical Memoranda on Field Activities B. Analytical Data and QA/QC Evaluation Results C. Risk Assessment Methods	

Table A.2 Outline for FS-EIS document*

II. FS-EIS Section ^b	Comments
Cover Sheet*	<ul style="list-style-type: none"> 40 CFR §1502.11 calls for a cover sheet.
Table of Contents*	<ul style="list-style-type: none"> 40 CFR §1502.10 calls for a table of contents.
Executive Summary	
1. Introduction 1.1 Purpose and Organization of Report	<ul style="list-style-type: none"> 40 CFR §1502.13 requires that an EIS briefly "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." This statement of purpose and need should be included in Sect. 1.1. Sect. 1.1 should also discuss DOE's NEPA-CERCLA integration policy and identify those sections of the FS report that were added or modified to satisfy NEPA requirements. Related NEPA documents (existing or planned) and CERCLA actions should also be identified.
1.2 Background Information 1.2.1 Site description 1.2.2 Site history 1.2.3 Nature and extent of contamination 1.2.4 Contaminant fate and transport 1.2.5 Baseline risk assessment	<ul style="list-style-type: none"> Sect. 1.2 can satisfy both the FS requirement for background information on the site and the NEPA requirement for an affected environment section in an EIS. Alternatively, portions of the RI may be designated to serve as the affected environment section of the EIS.
2. Identification and Screening of Technologies 2.1 Introduction 2.2 Remedial Action Objectives 2.3 General Response Actions 2.4 Identification and Screening of Technology Types and Process Options 2.4.1 Identification and screening of technologies 2.4.2 Evaluation of technologies and selection of representative technologies	<ul style="list-style-type: none"> Because the NEPA concern with assessment of environmental consequences is not limited to consequences that are regulated under current law, the listing in Sect. 2.2 of contaminants of interest should not be limited to those for which ARARs exist. Concerns and suggestions expressed during scoping should be considered when identifying general response actions.

*Modified from a draft outline prepared by the DOE Environmental Guidance Division (EH-231).

^bSection numbers and names correspond to EPA's (1988a) recommended FS format except as otherwise noted. Asterisk denotes a format modification made to satisfy NEPA requirements.

Table A.2 (continued)

FS-EIS Section	Comments
3. Development of Alternatives*	<ul style="list-style-type: none"> The preliminary screening of alternatives recommended by EPA (1988a) to avoid having to undertake detailed analysis of an excessively large number of alternatives should be avoided in an FS-EIS because it may appear to be incompatible with the NEPA directive (40 CFR §1502.14) to "rigorously explore and objectively evaluate all reasonable alternatives."
4. Detailed Analysis of Alternatives	<ul style="list-style-type: none"> Section 4 should contain the detailed analysis of alternatives that is required of a CERCLA FS, the assessment of environmental consequences that is required in an EIS (40 CFR §1502.16), and a comparative analysis of alternatives that meets the requirements of both CERCLA and NEPA.
4.1 Introduction	
4.2 Individual Analysis of Alternatives*	
4.2.1 Alternative 1	
4.2.1.1 Description	
4.2.1.2 Evaluation*	<ul style="list-style-type: none"> The no-action alternative should be carried through to Sect. 4 to satisfy NEPA [40 CFR §1502.14(d)].
4.2.2 Alternative 2	
4.2.2.1 Description	
4.2.2.2 Evaluation*	<ul style="list-style-type: none"> Each evaluation subsection (Sect. 4.2.x.2) should begin with an objective discussion of those observations, findings, and results of analyses that characterize the projected environmental consequences of the subject alternative and that are required to reach findings on the CERCLA criteria. Following this discussion, evaluations with respect to the CERCLA criteria should be presented.
4.2.3 Alternative 3	
4.2.3.1 Description	
4.2.3.2 Evaluation*	
4.3 Comparative Analysis	<ul style="list-style-type: none"> Comparison of the environmental consequences of the alternatives, as required by NEPA (40 CFR §1502.14), should be included in Sect. 4.3 discussions of the CERCLA criteria for overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, and short-term effectiveness.
5. Recommended Remedial Action*	<ul style="list-style-type: none"> CEQ regulations [40 CFR §1502.14(e)] require the lead agency to identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

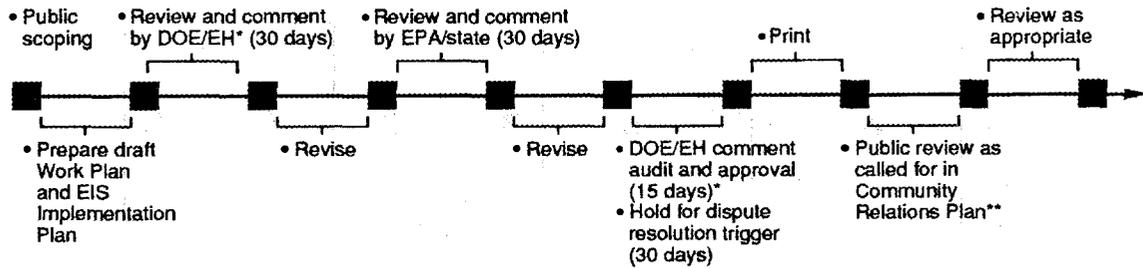
Table A.2 (continued)

FS-EIS Section	Comments
List of Preparers*	<ul style="list-style-type: none">● 40 CFR §1502.17 requires the EIS to include a list of the persons who prepared the document or significant background papers, with their professional qualifications. Copies of correspondence with other agencies and organizations should be provided to document the environmental review and consultation called for in 40 CFR §1502.25. 40 CFR §1502.10 calls for a list of the agencies, organizations, and individuals to which copies of the document will be sent.
Copies of Correspondence*	
Distribution of RI/FS-EIS*	
Appendices	
A. Responses to Comments (final document only)*	<ul style="list-style-type: none">● 40 CFR §1503.4 requires the agency to respond to all comments in the final EIS. All substantive comments received should be attached to the final EIS. The comment response section can also serve as the responsiveness summary that must be developed to meet CERCLA requirements.
B. Other appendices as needed	<ul style="list-style-type: none">● Appendices should be used to present in complete form technical information that was summarized in the text.

APPENDIX B
RI/FS-EIS DOCUMENT REVIEW TIMELINE

RI/FS-EIS DOCUMENT REVIEW TIMELINE¹

WORK PLAN PROCESS:



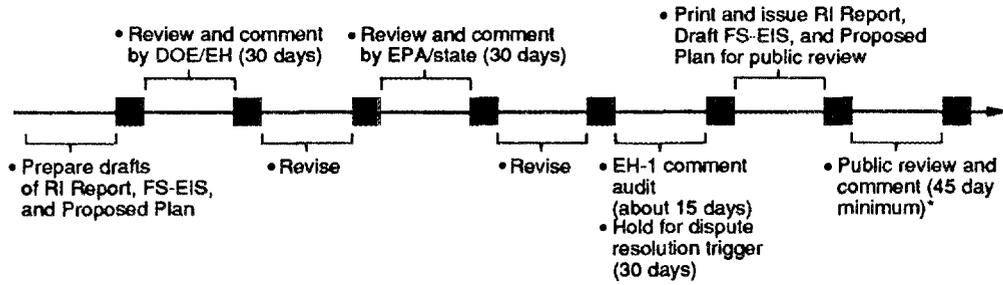
* The DOE Office of Environmental Guidance and Compliance (EH-23) has lead responsibility for review of RI/FS documents by EH headquarters offices, including review of NEPA plans and documents by the DOE office of NEPA Project Assistance (EH-25).

** Identification of public review periods is not intended to be all-inclusive. Public review periods shown are not necessarily formal review periods.

¹Based on a draft developed by the DOE Office of Environmental Guidance and Compliance (EH-23). Schedule information is provided for purposes of illustration; it is not authoritative guidance on DOE procedures. Note that durations for preparing, revising, and printing documents must be determined on a project-specific basis.

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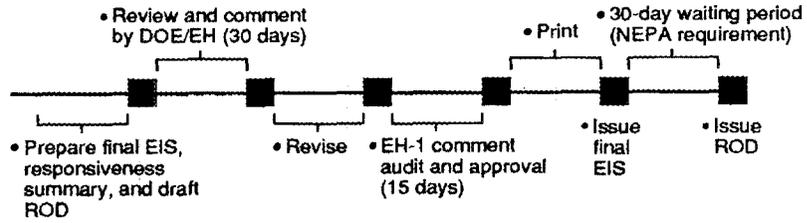
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