AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

1 of 1

RECEIVED

JUN 30 1994

11

ENGINEERING DATA TRANSMITTAL

JUL 28 1994

Page 1 of 1

1. EDT 606148

OSTI

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) 8B000	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: WAE/EGS	6. Cog. Engr.: R.G. Dieffenbacher	7. Purchase Order No.: N/A
8. Originator Remarks: <i>Supporting Document for approval & release</i>		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: N/A
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 6/27/94

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Impact Level	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-EN-TI-264		0	Remedial Design / Remedial Action Strategy Report	N/A	1/2	1	

16. KEY		
Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE DISTRIBUTION (See Impact Level for required signatures)										(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1/2	1	Cog. Eng. R.G. Dieffenbacher	<i>[Signature]</i>	6/2/94	H6-01	IRA (2)			H4-17	3	
1/2	1	Cog. Mgr. M.J. Lauterbach	<i>[Signature]</i>	6/2/94	H6-01	Central Files (2)			L8-04	3	
		QA				EPIC (2)			H6-08	3	
		Safety				L.S. Hermann			H6-07	3	
		Env.									

18. Signature of EDT Originator <i>R.G. Dieffenbacher</i> Date: 6-6-94	19. Authorized Representative for Receiving Organization <i>[Signature]</i> Date: 6/7/94	20. Cognizant/Project Engineer's Manager M.J. Lauterbach Date: _____	21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
--	--	--	--

MASTER

Date Received: 6-9-94 ARL		INFORMATION RELEASE REQUEST		Reference: WHC-CM-3-4	
Complete for all Types of Release					
Purpose			ID Number (include revision, volume, etc.) WHC-SD-EN-TI-264, Rev. 0		
☐ Speech or Presentation ☐ Full Paper (Check only one suffix) ☐ Summary ☐ Abstract ☐ Visual Aid ☐ Speakers Bureau ☐ Poster Session ☐ Videotape			☐ Reference ☒ Technical Report ☐ Thesis or Dissertation ☐ Manual ☐ Brochure/Flier ☐ Software/Database ☐ Controlled Document ☐ Other		
			Date Release Required <div style="text-align: right;">June 30, 1994</div>		
Title Remedial Design/Remedial Action Strategy Report			Unclassified Category UC-N/A		Impact Level N/A
New or novel (patentable) subject matter? ☒ No ☐ Yes If "Yes", has disclosure been submitted by WHC or other company? ☐ No ☐ Yes Disclosure No(s).			Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? ☒ No ☐ Yes (Identify)		
Copyrights? ☒ No ☐ Yes If "Yes", has written permission been granted? ☐ No ☐ Yes (Attach Permission)			Trademarks? ☒ No ☐ Yes (Identify)		
Complete for Speech or Presentation					
Title of Conference or Meeting N/A			Group or Society Sponsoring		
Date(s) of Conference or Meeting N/A		City/State	Will proceedings be published? ☐ Yes ☐ No		Will material be handed out? ☐ Yes ☐ No
Title of Journal					
CHECKLIST FOR SIGNATORIES					
Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval		
			Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	☐	☒			
Patent - General Counsel	☐	☒			
Legal - General Counsel	☐	☒			
Applied Technology/Export Controlled Information or International Program	☐	☒			
WHC Program/Project	☐	☒			
Communications	☐	☒			
RL Program/Project	☒	☐	B.L. Foley <i>[Signature]</i> 6/23/94		
Publication Services	☒	☐	L.S. Hermann <i>[Signature]</i> 6/23/94		
Other Program/Project	☐	☒			
Information conforms to all applicable requirements. The above information is certified to be correct.					
Yes No			INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP		
References Available to Intended Audience ☒ Yes ☐ No			Stamp is required before release. Release is contingent upon resolution of mandatory comments. <div style="text-align: center;"> </div>		
Transmit to DOE-HQ/Office of Scientific and Technical Information ☒ Yes ☐ No					
Author/Requestor (Printed/Signature) Date					
R.G. Dieffenbacher <i>[Signature]</i> 6-6-94					
Intended Audience ☐ Internal ☐ Sponsor ☒ External			<div style="text-align: center;"> </div>		
Responsible Manager (Printed/Signature) Date					
M.J. Lauterbach <i>[Signature]</i> 6/1/94			Date Cancelled Date Disapproved		

SUPPORTING DOCUMENT		1. Total Pages 708
2. Title Remedial Design/Remedial Action Strategy Report	3. Number WHC-SD-EN-TI-264	4. Rev No. 0
5. Key Words remedial design, remedial action, CERCLA, Record of Decision, DOE Order 4700.1	6. Author Name: R.G. Dieffenbacher <i>[Signature]</i> 6-6-94 Signature Organization/Charge Code 8B000/P161L	
7. Abstract <i>U. Burkland 6/24/94</i> Dieffenbacher, R.G., 1994, <i>Regulatory Compliance Strategy Report</i> , WHC-SD-EN-TI-264, Rev. 0, Westinghouse Hanford Company, Richland, Washington.		
<p>8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.</p> <p>PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.</p> <p>DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.</p>		<p>10. RELEASE STAMP</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>OFFICIAL RELEASE 11</p> <p>BY WHC</p> <p>DATE JUN 30 1994</p> <p><i>Station # 12</i></p> </div>
9. Impact Level N/A		

CONTENTS

1.0	INTRODUCTION	1
2.0	BENCHMARKING RESEARCH	3
2.1	APPLICATION OF CERCLA MANAGEMENT PROCESS WITHIN THE DOE . . .	3
2.2	APPLICATION OF CERCLA MANAGEMENT PROCESSES IN NON-DOE SECTORS	3
2.2.1	Summary of CERCLA Management Process Requirements . . .	3
2.2.2	RD/RA Management Oversight Considerations	4
2.2.3	Status of Non-DOE Cleanup Efforts	5
3.0	ANALYSIS OF METHODOLOGIES	7
3.1	DESIGN METHODOLOGY	14
3.2	GENERAL OPERATIONS AND MAINTENANCE	16
3.3	LONG-TERM MONITORING REQUIREMENTS	17
4.0	REGULATORY COMPLIANCE STRATEGY	19
4.1	DETERMINATION OF RD/RA ACTIVITY COMPLEXITY	19
4.2	FLOW CHARTS	30
4.3	FLOW CHART DESCRIPTIONS AND REFERENCES	30
4.3.1	CERCLA Process Pre-RD/RA Activities	30
4.3.2	RD/RA Process	34
4.3.3	Post RD/RA Activities	36
4.4	PROJECT MANAGEMENT PROCESS DOE ORDER 4700.1	37
4.4.1	Pre-Title I/II Activities	37
4.4.2	Preliminary and Detailed Design	39
4.4.3	Post-Title I/II Activities (Title III Services)	40
4.5	SAFETY ANALYSIS PROCESS FOR RD/RA	42
4.6	NEPA PROCESS 10 CFR 1021 & DOE ORDER 5440.1E	43
4.6.1	Pre-RD/RA Activities	43
4.7	POLICY MANUAL AND DESIGN PHASE PROCEDURE MATRICES	44
5.0	SUMMARY AND CONCLUSIONS	71
6.0	REFERENCES	73
7.0	BIBLIOGRAPHY	75

FIGURES:

1.	Overview of Project Management	21
2.	Guidance for Simple ER Projects at Hanford	23
3.	Guidance for Intermediate ER Projects at Hanford	25
4.	Guidance for Complex ER Projects at Hanford	27

CONTENTS (cont)

TABLES:

1. EPA Requirements and Guidance Documents Currently in Preparation or Revision	6
2. Comparison of DOE Order 4700.1 Remedial Design Requirements to CERCLA Documentation	39
3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix	45
3. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities	57

LIST OF ACRONYMS

ANSI/ASQC	American National Standards Institute/American Standards for Quality Control
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CATEX	Categorical Exclusion
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
EIS	Environmental Impact Statement
ER	Environmental Restoration
FONSI	Finding Of No Significant Impact
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
OSWER	Office of Solid Waste and Emergency Response
QA	Quality Assurance
RA	Remedial Action(s)
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCS	Regulatory Compliance Strategy
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RDR	Remedial Design Report
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SOPs	Standard Operating Procedures
TBD	To Be Determined
TPA	Tri-Party Agreement
WHC	Westinghouse Hanford Company

REGULATORY COMPLIANCE STRATEGY REPORT

1.0 INTRODUCTION

This draft Regulatory Compliance Strategy (RCS) report was prepared by Parsons Environmental Services, Inc. and Golder Associates, Inc. for the Westinghouse Hanford Company (WHC) Environmental Restoration (ER) program, under WHC purchase order MJL-SVV-334941 "Remedial Design, Remedial Action, and Regulatory Compliance Research, Strategy and Implementation for Restoration Activities."

The development of the RCS will aid the ER program in developing and implementing Remedial Design/Remedial Action (RD/RA) projects. The intent of the RCS is to provide guidance for the implementation of project management requirements and to allow the implementation of a flexible, graded approach to design requirements depending on the complexity, magnitude, schedule, risk, and cost for any project.

The RCS provides a functional management-level guidance document for the identification, classification, and implementation of the managerial and regulatory aspects of an ER project. The RCS has been written from the perspective of the ER Design Manager and provides guidance for the overall management of design processes and elements. The RCS does not address the project engineering or specification level of detail. Topics such as project initiation, funding, or construction (Title III) are presented only in the context in which these items are important as sources of information or necessary process elements that relate to the design project phases.

Section 2.0 presents the results from research of RD/RA process "benchmarking" at remediation sites operated by both government offices and the private sector. The research focuses on identifying current remediation activities, managerial practices, established benchmarking activities to measure contractor/project performance, and review/validation processes required for complex projects.

Section 3.0 provides a summary on development and execution of the design methodology for actions associated with remediation. The section will focus on the selection process and rationale for preliminary design criteria, considerations for general operation and maintenance requirements, and the evaluation process for long-term monitoring requirements.

Section 4.0 provides the rationale for identification of RD/RA project complexity and the appropriate level of regulatory and management system requirements. It is important to accurately apply the appropriate classification to the remediation activity through a graded approach. A text is presented as a guide for determining the appropriate ER project classification.

Three flow charts were developed to depict RD/RA project requirements related to regulatory (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA], National Environmental Policy Act [NEPA], and Health and Safety) and project management issues. The complexity of any ER RD/RA project can be generically classified as a simple, intermediate, or complex project. Once classified, the appropriate flow chart identifies the level of effort necessary for compliance with applicable regulatory and project management drivers (the graded approach). The five categories of remedial actions (RA) as defined in the scope of work are:

- Soil and solid waste management
- Surface and subsurface barriers and containment structures
- In-situ treatment of contaminated soils and groundwater
- Ex-situ treatment of contaminated soils and groundwater within the confines of an operable unit
- Centralized treatment, storage, or disposal facilities.

These types of projects have been classified as simple, intermediate, or complex projects as identified on the flow charts. The text for the flow charts briefly describes each element of the project and provides references to guidance documents for developing the specific section requirements.

Sections 4.1 and 4.2 provide guidance for the project manager in identifying the appropriate project classification (simple, intermediate, or complex) and provide the simple, intermediate, and complex flow charts.

Sections 4.3 - 4.6 provide the narrative associated with the flow charts. This text provides some insight to the task as well as associated guidance documents, such as CERCLA and NEPA regulations, U.S. Department of Energy (DOE) Orders, and applicable implementing WHC project management and standard engineering procedures.

Section 4.7 presents matrices linking DOE Order requirements, CERCLA, Washington Department of Ecology, and WHC site procedures and will, to the extent practicable, use existing WHC defined processes. The matrices will identify required documents for implementing regulatory compliance. In cases where a procedure does not exist, the need to develop the procedure will be noted.

A summary of additional documents required for implementing ER projects will be compiled in Section 5.

Section 5.0 provides a summary of benchmarking research and results of analysis of RD/RA methodologies.

Sections 6.0 and 7.0 provide a detailed listing of all references, including the following:

- DOE Orders and Directives
- Hanford Site Directives and References
- U.S. Environmental Protection Agency (EPA) publications.

2.0 BENCHMARKING RESEARCH

2.1 APPLICATION OF CERCLA MANAGEMENT PROCESS WITHIN THE DOE

The RD/RA work plan being developed for Operable Unit 3, process area, at Fernald is driven by the CERCLA process while utilizing DOE Order 4700.1 for guidance in developing and managing the design and construction process. By utilizing DOE Order 4700.1 for guidance in strategic planning, project planning and budgeting, developing design criteria, environmental planning and review, construction planning, and project transition, Fernald feels that the intent of DOE 4700.1 is being applied to the development of the RD/RA work plan process. (Two project engineers were contacted to discuss how DOE Order 4700.1 is being implemented. It appears that the terminology of DOE Order 4700.1 is being utilized yet it is unclear as to how DOE Order 4700.1 is actually being implemented.)

The Rocky Flats Plant at this time is not at the point of developing a RD/RA document. However, the Rocky Flats ER Program has developed a draft design guidance manual using a compliance strategy (CERCLA primacy with concurrent utilization of DOE Order 4700.1) similar to Fernald.

2.2 APPLICATION OF CERCLA MANAGEMENT PROCESSES IN NON-DOE SECTORS

2.2.1 Summary of CERCLA Management Process Requirements

As in the DOE sector, the U.S. Department of Defense (DoD) and commercial RD/RA activities conducted under CERCLA typically begin after the Record of Decision (ROD) has been approved. The preliminary design planning activities can already be underway if the primary features of the Remedial Design (RD) were previously established with some certainty. CERCLA projects generally fall into one of the two following categories: 1) funded facilities, in which the EPA or a lead state agency funds the remediation and retains responsibility for contracting and directing the RA (regardless of whether or not cost recovery actions may result); and 2) facilities for which Consent Decrees are issued that specify the responsibilities of the EPA or lead state agency and which names the potentially responsible parties. If a Consent Decree has been issued, it usually addresses responsibilities for funding, contracting, and oversight functions. In the case of RA conducted at DoD facilities managed under CERCLA, the Consent Decree is usually replaced by an Interagency Agreement between EPA and the DoD agency.

In both of these scenarios RD/RA activities generally include 1) completion of the RD with the option of post-ROD treatability studies; 2) preparation of an RA Work Plan; 3) preparation of Requests for Proposal for RA contractor services and subsequent contract award; 4) implementation of the RD by the RA contractor, subject to monitoring and verification of progress at the direction of the regulator agency (or other party assigned such responsibilities as a condition of the ROD); and 5) verification of the

attainment of the ROD goals in the completed RA at the direction of the regulatory agency.

2.2.2 RD/RA Management Oversight Considerations

Whether the RA is managed directly by EPA or under a Consent Decree or Interagency Agreement, the management and direction of all such projects typically follows current EPA requirements and guidelines. This observation may be confirmed by examination of summary information obtained from EPA Superfund Fact Sheets (see EPA Region 10 Superfund Fact Sheet series, 1991 through 1994) which generally indicate that current EPA requirements and guidance documents are being followed, EPA oversight is being applied to RD/RA activities, and that construction is proceeding using a wide variety of technologies and routine contracting and construction practices.

With regard to its current management and oversight practices, EPA has produced a wide variety of requirements and guidance documents over the last decade that attempt to fill the gaps between the legal requirements contained in CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan regulations. These EPA documents also outline the practical steps that must be taken on a daily basis to implement RD/RA activities. The objectives that drive the RA are typically the product of the Remedial Investigation/Feasibility Study (RI/FS) process, and are defined by the ROD. The site-specific cleanup standards and the sampling, monitoring, operations and maintenance (O&M), and quality assurance (QA) checks required to achieve the RA objectives are typically contained in the RA Work Plan and/or the Consent Decree or Interagency Agreement. Oversight of all remediation activities is typically provided by EPA project managers. However, in addition to the agency-wide requirements and guidelines previously described, individual EPA project managers have also worked under directives and policies established within each EPA Region. As a consequence, the methods used for management and oversight of RD/RA activities have exhibited considerable variability from Region to Region, and, in some cases, site to site.

For a number of years, EPA has been criticized for its decentralized approach to Superfund cleanup activities and the lack of consistency in the management controls that have typically been applied to these types of projects. In response to this criticism, EPA has taken a number of initiatives to establish consistent management systems. EPA performed a comprehensive management review of the Superfund program in 1989 (EPA 1989) which resulted in a large number of specific improvement actions. In one of the most significant of EPA's recent actions, the agency has become deeply involved in the development of a national consensus standard for the management of environmental cleanup projects of all types. This standard was co-authored by EPA; it will be issued as American National Standards Institute/American Standards for Quality Control (ANSI/ASQC) Standard E4-19XX. ANSI/ASQC E4 is in the final draft strikeout/redline review phase, and is likely to be finalized in calendar year 1994. According to EPA's Quality Assurance Management Staff, the draft ANSI/ASQC E4 standard is currently driving the development of a full suite of EPA requirements and guidance documents, which collectively represent a profound shift towards the establishment of a comprehensive quality management approach to all

environmental cleanup operations under the EPA's jurisdiction. A table listing the new EPA requirements and guidance documents in development or review in 1994 is provided in Table 1.

The net result of these developments within EPA will be that non-DOE cleanup efforts will be performed under comprehensive project management controls that are generally consistent with the level of control typically provided on a DOE site through implementation of DOE Order 4700.1, DOE Order 5700.6C, and other applicable Orders.

2.2.3 Status of Non-DOE Cleanup Efforts

A General Accounting Office (GAO 1993) report stated that as of September 30, 1992, EPA had removed or controlled significant amounts of hazardous waste from 177 sites that have been deleted from the National Priorities List or are reported as "construction-complete." Precise data were not available in the cited report, but the preponderance of these sites is likely to be from non-DOE sectors. The construction-complete category is applied to sites where construction of the cleanup remedy was finished, although contaminant removal and monitoring may be ongoing. Included with the 177 sites deleted or reported as construction-complete are 23 sites at which no removal or RA were necessary. There are presently nearly 1300 total sites on the National Priorities List, which is growing by approximately 100 sites annually.

Within Region X, 71 sites are identified on the National Priorities List. As of November 5, 1993, 54 sites have progressed to (or beyond) RA phase 1 based on information from the Comprehensive Environmental Response, Compensation, and Liability Information System database (EPA-10 1993). To date, 14 of the 54 sites are DoD facilities, primarily military bases.

Table 1. EPA Requirements and Guidance Documents
Currently in Preparation or Revision.

EPA QA/R1	<i>EPA Quality Systems Requirements for Environmental Programs</i>
EPA QA/G-1	<i>Guidance for Developing, Implementing, and Evaluating Quality Systems for Environmental Data Operations</i>
EPA QA R-2	<i>EPA Requirements for Quality Management Plans</i>
EPA QA/R-2A	<i>EPA Requirements for Quality Management Plans for Analytical Laboratories and Facilities</i>
EPA QA/G-2	<i>Guidance for Preparing, Reviewing, and Implementing Quality Management Plans</i>
EPA QA/G-3	<i>Guidance for Preparing, Conducting, and Reporting the Results of Management Systems Reviews</i>
EPA QA/G-4	<i>Guidance for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process</i>
EPA QA/R-5	<i>EPA Requirements for Quality Assurance Project Plans</i>
EPA QA/G-5	<i>Guidance for Preparing, Reviewing, and Implementing Quality Assurance Project Plans for Environmental Programs</i>
EPA QA/G-6	<i>Guidance for Preparing, Reviewing, and Implementing Standard Operating Procedures for Environmental Data Operations</i>
EPA QA/G-7	<i>Guidance for Determining Quality Training Requirements for Environmental Data Operations</i>
EPA QA G-8	<i>Guidance for Preparing, Conducting, and Responding to Technical Assessments for Environmental Data Operations</i>
EPA QA/G-9	<i>Guidance for Environmental Data Quality Assessment: Managing the Process</i>
EPA QA/G9A	<i>Guidance for Environmental Data Quality Assessment: Statistical Procedures</i>
EPA QA/R-10	<i>EPA Quality Assurance Requirements for Computer Hardware and Software Systems for Environmental Programs</i>
EPA QA/G-10	<i>Guidance for Implementing Quality Assurance Requirements for Computer Hardware and Software Systems for Environmental Programs</i>
EPA QA/G-11	<i>Guidance for Planning, Implementing, and Assessing Quality in Effective Project Management</i>

3.0 ANALYSIS OF METHODOLOGIES

Various approaches to implementing RD/RA at a CERCLA site can be taken; however, each approach must address certain phases as appropriate. These phases are based on the requirements established within the National Contingency Plan under 40 CFR 300 and include the following:

- Remedial Design (RD)
- RA
- O&M
- Long-term Monitoring.

The primary emphasis on the CERCLA process is the implementation of the RA, which involves the development of plans and procedures to ensure the safe implementation of the RA while protecting human health and the environment.

The primary role of CERCLA requirements for RD/RA activities at Hanford is prescribed by the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement [TPA]). The TPA provides the consent of DOE, EPA, and the State of Washington Department of Ecology for conduct of Hanford RD/RA activities in compliance with CERCLA regulations. The applicability of compliance with DOE orders governing project management can be determined by the ER project manager through a graded approach based on an evaluation of project complexity. As DOE is a party to the TPA, compliance with the intent of DOE Orders is implicit in compliance with CERCLA (as required by the TPA).

In addition to the above CERCLA requirements for RD/RA, DOE contractors are also required to follow DOE requirements specified in DOE Orders. Although DOE Orders are not enforceable as a regulatory requirement, they are contractual obligations. Adherence to the requirements of DOE Order 4700.1, Project Management System is of particular interest in implementing an ER project at a DOE facility. This Order identifies cost, schedule, and technical controls to ensure that major projects are completed in a cost-effective manner. The primary focus of DOE Order 4700.1 is the control of capital type projects with particular emphasis on system development, engineering design, and construction specifications. The provisions of DOE Order 4700.1 generally terminate on completion of construction, at which time the facility is turned over to an operations group as part of the operating budget for the plant site.

When applied to an environmental remediation project, some of the provisions within DOE Order 4700.1 may not be prudent since these projects are generally of short duration, do not provide capital improvements, do not pose a significant radiological hazard, or may conflict with legally binding CERCLA requirements. However, some CERCLA remediation projects could involve complex treatment systems which, if improperly implemented, could have an adverse impact on workers, the public, or the environment.

The design requirements of DOE Order 4700.1 and the parallel requirements found in CERCLA documents were compared. Differences between CERCLA and DOE Order 4700.1 fall into the two following primary categories:

design/construction and project controls requirements. These are a result of the difference in goals and objectives for CERCLA versus DOE Order 4700.1 documentation. CERCLA documentation is geared toward successful remediation of a contaminated site (including EPA and public review), while DOE Order 4700.1 documentation is geared toward successful management (technical, scheduling, and financial) of design and construction of new facilities with nuclear components. DOE Order 4700.1 requirements may be applicable to ER projects that involve new construction (e.g. construction of centralized treatment, storage, or disposal facilities). However, for many ER projects (e.g. waste excavation, in situ treatment of soil or groundwater, mobile treatment within the confines of an operable unit) a graded approach to the application of DOE Order 4700.1 requirements is appropriate.

Differences between CERCLA and DOE Order 4700.1 documentation are briefly described below.

Conceptual Design Report

DOE Order 4700.1 requires development of a conceptual design report (CDR). Items in the CDR outline which are not included in CERCLA are work breakdown structures and assessments for energy conservation, telecommunications, computer equipment, provisions for the handicapped, and provisions for fallout shelters. Work breakdown structures are an important part of schedule and budget control and would probably be included in the RDR and RAWP for any ER project even though they are not specifically required by CERCLA regulation. Assessments for energy conservation, telecommunications, computer equipment, handicapped access, and fallout shelters are more in line with construction of an inhabited facility, and are probably not applicable to ER projects.

Project Management Plan

Elements of a DOE Order 4700.1 project management plan with no direct CERCLA parallel include:

- Work breakdown structures,
- Cost and manpower estimates,
- Planning and control systems,
- Information and reporting,
- Systems engineering management,
- Configuration management,
- Contingency,
- Utilities,
- Advance acquisition plan, and
- Test and evaluation plan.

All of the above DOE Order 4700.1 requirements should be reviewed on a project-by-project basis to determine applicability. Applicable items should be included in the RDR or RAWP.

Design Criteria Package

DOE Order 4700.1 requirements for the design criteria package with no direct CERCLA parallel include:

- Procurement changes,
- Type of specification,
- Contents of bid packages,
- Computer programs,
- Reports and calculations,
- Suggested drawings and titles,
- Drawing size, type, and number of copies, and
- Itemized construction cost estimate.

A project-specific graded approach should be used to determine the applicability of these requirements for ER projects, and applicable items should be included in the RDR or RAWP.

Title I and Title II Design

Title I and Title II design requirements found in DOE Order 4700.1 closely parallel CERCLA documentation for RDRs and RAWPs with the exception of cost estimates and bidding documents requirements.

Table 2. Comparison of DOE Order 4700.1 Remedial Design Requirements to CERCLA Documentation (sheet 1 of 4)

DOE Order 4700.1 Requirement	Location in CERCLA Documentation
Conceptual Design Report	
Justification and scope	Proposed Plan and Pre-Design Report
Performance requirements	Pre-Design Report and RDR-Preliminary Design
Cost estimate	Pre-Design Report
Design/procurement/construction schedules	Pre-Design Report and RDR-Preliminary Design
Design/procurement/construction methods	Pre-Design Report
Work breakdown structures	
Assessment for: security	Pre-Design Report
energy conservation	
health & safety	Pre-Design Report and RDR
environmental protection	Pre-Design Report
decontamination & decommissioning	Pre-Design Report and RAWP
quality assurance	Pre-Design Report and RDR
maintenance and operations	Pre-Design Report
telecommunications	
computer equipment	
provisions for handicapped	
provisions for fallout shelter	
Analysis of uncertainties and contingencies	Pre-Design Report
Conceptual drawings	Pre-Design Report
Outline specifications	RDR-Preliminary Design
Applicable codes and standards	RDR-Preliminary Design

Table 2. Comparison of DOE Order 4700.1 Remedial Design Requirements to CERCLA Documentation (sheet 2 of 4)

DOE Order 4700.1 Requirement	Location in CERCLA Documentation
Project Management Plan	
Introduction	Pre-Design Report
Objectives	Pre-Design Report
Management organization and responsibilities	RDR
Work plan	RDR and RAWP
Work breakdown structures	
Schedule	Pre-Design Report
Logic diagrams	Pre-Design Report
Performance criteria	RDR-Preliminary Design
Cost and manpower estimates	
Project functional support requirements	RDR
Project management and measurement systems	Pre-Design Report and RDR
Planning and control systems	
Information and reporting	
Systems engineering management	
Configuration management	
Contingency	
Quality assurance	RDR-Pre-Final/Final Design
Utility services	
Responsibility matrix	RDR
Annexes: advance acquisition plan	
test and evaluation plan	RDR (if treatability studies are required)
ES&H protection implementation plan	Pre-Design Report
Submission and approval	

Table 2. Comparison of DOE Order 4700.1 Remedial Design Requirements to CERCLA Documentation (sheet 3 of 4)

DOE Order 4700.1 Requirement	Location in CERCLA Documentation
Design Criteria Package	
Function to be performed by the project	Pre-Design Report
General description of facility	Pre-Design Report
Applicable publications or information	Pre-Design Report
Applicable codes, standards, or guides	RDR-Preliminary Design
General description of: structural requirements	RDR-Preliminary Design
mechanical systems	RDR-Preliminary Design
electrical systems	RDR-Preliminary Design
detection monitoring	RDR-Preliminary Design
alarm and control systems	RDR-Preliminary Design
special facilities	RDR-Preliminary Design
special equipment	RDR-Preliminary Design
standard equipment	RDR-Preliminary Design
QA measures	RDR-Pre-Final/Final Design
General information on: procurement clauses	
type of specifications	
contents of bid packages	
computer programs	
reports and calculations	
Suggested drawings and titles	
Drawing size, type, and number of copies	
Itemized construction cost estimate	

Table 2. Comparison of DOE Order 4700.1 Remedial Design Requirements to CERCLA Documentation (sheet 4 of 4)

DOE Order 4700.1 Requirement	Location in CERCLA Documentation
Title I Design Summary	
General description of work	RDR-Preliminary Design
Analysis of safety and pollution aspects	Pre-Design Report
Environmental considerations	Pre-Design Report
Justification of size/capacity/type of equipment	RDR-Preliminary Design
Process operation diagrams	RDR-Preliminary Design
Use of existing structures	RDR-Preliminary Design
Plot plan, building plans, equipment layouts	RDR-Preliminary Design
Outline specifications	RDR-Preliminary Design
Major operating equipment	RDR-Preliminary Design
Cost estimate	
Start and complete dates	RDR-Preliminary Design
Proposed method of accomplishment	RDR-Preliminary Design
Title II Design	
Revisions to Title I design	RDR-Pre-Final/Final Design
Final working drawings	RDR-Pre-Final/Final Design
Final specifications	RDR-Pre-Final/Final Design
Bidding documents	
Cost estimates	
Project coordination	RAWP
Firm procurement schedule	RAWP
Firm construction schedule	RAWP
Assistance in analyzing bids or proposals	RAWP

Although all of the provisions of DOE Order 4700.1 may not be necessary for a particular project, there are some basic project management principles within DOE Order 4700.1 that should be incorporated into the

overall RD/RA program to ensure cost-effective solutions. These principles include the following:

- Defining project requirements and objectives during the early planning stages
- Controlling and maintaining project baselines (technical, schedule, and budget) to ensure that the necessary resources are available when required and to assess potential impacts
- Providing a mechanism to justify expenditure of funds
- Establishing procedures to ensure that changes to the baselines are properly controlled and coordinated
- Verifying that project implementation is progressing as planned through reviews (i.e., design, management, operational readiness) at key points
- Evaluating the project on completion to generate "lessons learned," financial reports, and schedule modifications for improving future projects.

This section describes the overall recommended RD/RA approach that was devised based on the CERCLA and DOE Order requirements as they are being applied at other remediation sites. It is recognized that the level of detail that is required to implement any particular remediation project is dependent on the complexity of the project. As such, a graded approach to the implementation of a remediation project under CERCLA and DOE Order constraints is required. The following subsections provide an overall discussion of the elements associated with the design, O&M, and long-term monitoring phases of a CERCLA remediation project conducted at the Hanford facility. The overall objectives of integrating the CERCLA and DOE Order project management requirements are to do the following:

- Demonstrate adherence to both sets of requirements through the implementation of a common program
- Identify those requirements that are not applicable to and the level of detail needed for a particular type of project on a graded approach
- Obtain DOE concurrence on the implementation of a sound RD/RA program for environmental remediation projects at Hanford.

3.1 DESIGN METHODOLOGY

The RD/RA design methodology was previously evaluated at the Fernald Environmental Management Project and at the Rocky Flats Plant. The Rocky Flats methodology was modelled after the Fernald process and is summarized in this section. It is anticipated that WHC projects will parallel the

experience of Fernald and Rocky Flats, and thus the RD/RA design methodology will be very similar.

The development of design requirement and criteria for a project begins at the time the need for the project is identified. The first step in defining the scope of the project is the preparation of an Engineering Study. The engineering study provides the preliminary engineering and feasibility analysis to evaluate alternatives for new projects, establish parameters for such items as new equipment requirements, evaluate the availability of existing facilities to accomplish the project objectives, select a preferred alternative, and estimate the project cost and schedule. The Design Manager shall determine whether an engineering study is required.

If the engineering study is required, project alternatives should be evaluated against criteria such as project objectives, construction cost, life cycle cost, operability, maintainability, worker protection, health, and safety, worker radiation exposure, technology availability, and other criteria as appropriate (such as compliance with environmental regulations and DOE Orders).

The functional design criteria and subsequent project design efforts are statements of functional parameters that the project must meet. These functional parameters, which include functional requirements, functional design criteria, and functional regulatory bases, may be combined into a single document, known as the Operational Requirement Document. The information and criteria in this document are further developed, validated, and expanded during the next phase of the project, which involves the development of the Conceptual Design Report.

As presented in DOE Order 4700.1, *Project Management System*, the development of functional requirements and criteria is associated with the Systems Engineering process, which is conducted early in the planning phases of a project. The concepts of the Systems Engineering Process, including function analysis, functional allocation, and functional requirements and criteria, should be considered when developing the initial project functional requirements.

As a general rule, the functional requirements are directly proportional to project complexity. That is, as project requirements increase, the functional requirements become more detailed and voluminous. The responsible manager should reference DOE and site guidelines for requirements that are applicable to large projects involving complex schedules and technical baselines. For small projects of short duration, the functional requirements will be much simpler because not all of the elements of the Systems Engineering process will be applicable. The amount of detail that is appropriate for the specific project must be determined and justified by the Design Manager.

For certain smaller projects where sufficient information is provided by preliminary engineering to proceed to preliminary (Title I) design, it may not be necessary to develop a Conceptual Design Report.

The selected preferred alternative shall be consistent with applicable, or relevant and appropriate requirements (ARARs) (regulatory) and with other defining functional requirements (e.g., codes, standards, and good engineering practices). It is recommended that a preliminary or conceptual design be completed prior to the ROD being approved. This action will insure the timely identification of any potential compliance problems related to the RA implementation. If waivers for ARARs are required, they can be negotiated and incorporated as part of the ROD.

When conducting Engineering Studies and Analyses for Functional Requirements Development, the responsible party must do the following:

1. Establish the need for the proposed project
2. Define project scope, objectives, and constraints
3. Review existing project-related materials
4. Establish initial functional parameters
5. Establish alternatives
6. Establish evaluation criteria
7. Develop costs for alternatives
8. Evaluate alternatives versus criteria
9. Select preferred alternative
10. Develop preferred alternative
11. Prepare Functional Requirements
12. Conduct Functional Analysis
 - A. Evaluate needed functions
 - B. Evaluate required performance
 - C. Establish time lines
13. Conduct Functional Allocation
14. Define subsystem requirements
 - A. Establish interfaces
 - B. Define support requirements
15. Prepare Draft Functional Requirements
 - A. Review DOE Orders and directives
 - B. Incorporate consideration of state and federal regulations
 - C. Integrate industry/consensus standards and codes
16. Submit Functional Requirements for Inclusion in the Operational Requirements Document
 - A. Conduct internal review based on preparation criteria
 - B. Submit current or revised requirements for review
 - C. Review/resolve comments
 - D. Issue Functional Requirements to be used for Operational Requirement Document.

3.2 GENERAL OPERATIONS AND MAINTENANCE

Under CERCLA, completion of the RA is accomplished when the Remedial Action Objectives as specified in the ROD are attained. For soil excavation, the RA can be implemented and accomplished in a timely manner. For projects involving the remediation of groundwater or solid waste, the time required to meet the Remedial Action Objectives could take several years.

Once the Remedial Action Objectives have been obtained, O&M measures (as required) can commence. CERCLA identifies a remedy as "operational and functional" when construction is complete or when the remedy is determined concurrently by EPA and the state to be functioning properly and performing as designed, whichever is earlier.

The results of the Safety and Risk Management process will be utilized in developing the O&M plan. The project complexity will indicate the need for physical/mechanical requirements such as process controls, system backup requirements, and specific Standard Operating Procedures (SOPs). The Safety Analysis Report (or applicable safety document) and the Operational Readiness Review shall be referenced for developing the SOPs. These two documents will be utilized in the development of process controls, Failure Effect Mode Analysis, proper installation, and acceptance tests. During the Operational Readiness Review process, the SOPs will be revised or the design requirements revisited to ensure the accurate generation of SOPs. Once the operations are underway, inspections and audits will be utilized to verify and if necessary revise the SOPs to ensure both worker safety and compliance with remediation goals.

3.3 LONG-TERM MONITORING REQUIREMENTS

In cases where a hazardous waste has been treated, stored, or disposed of, the owner or operator shall follow the requirements identified in Subpart F of 40 CFR 264. Pertinent requirements under Subpart F include the installation of a compliance monitoring program and, if the groundwater protection standard (40 CFR 264.92) is exceeded, the implementation of a corrective action program (40 CFR 264.100).

The Regional Administrator will identify the point of compliance for groundwater protection within the facility permit. If the permit compliance levels are exceeded, 40 CFR 264.92 will require the implementation of a groundwater monitoring program. The facility permit also identifies the length of the compliance period. The compliance period typically is equal to the active life of the waste management activity prior to permitting and closure requirements. If the owner/operator is engaged in a corrective action program at the end of the compliance period, the period will be extended until the owner/operator can demonstrate that the groundwater protection standard has not been exceeded for three consecutive years.

4.0 REGULATORY COMPLIANCE STRATEGY

The extent and complexity of the remediation action can significantly increase the regulatory requirements. Therefore, it will be important to accurately apply the appropriate classification to the remediation activity (simple, intermediate, or complex) through a graded approach. A text has been developed as a guide for determining the appropriate ER project classification (Figures 1 through 4).

The following subsections will identify the components of the flow charts and provide guidance for determining the appropriate project classification. The charts are divided into three levels of complexity based on the project classification. The variation within the charts is based on the complexity of the ER project. The charts utilize a graded approach for implementing the remediation projects. One illustration of the graded approach is found in the preliminary/detailed design phase. In this phase simple projects require development of performance specifications only, while intermediate projects require development of combined Title I/II design packages, and complex projects require separate Title I and Title II design packages as well as review/validation processes. A brief description of the flow charts includes each element of the project and provides references to guidance documents for developing the specific section requirements.

4.1 DETERMINATION OF RD/RA ACTIVITY COMPLEXITY

An attempt to facilitate the overall management of RD/RA activities under CERCLA for a project at Hanford has been made by categorizing the complexity of the project as simple, intermediate, or complex. The time-line/flow charts (Figures 1 through 4) provided in this report identify the level of preliminary and detailed design planning, management, and reporting that is appropriate for each category.

Selection of the appropriate category for a given ER project depends upon an assessment of the general level of complexity of the project and the corresponding level of effort and control required to implement or construct the RA. The assessment should consider not only the number and level of complexity of the technologies required by the RAs, but also the construction tolerances required, the logistical support necessary, and the type and amount of QA sampling and construction monitoring required to implement the RA.

Overview of Project

Project Management

WHC-SD-EN-TI-264, Rev. 0

Figure 1. Overview of Project Management.

Guidance for Simple

Project Planning
and Authorization

Design Development/
System Engineering

Conceptual
Remedial
Sele

CERCLA
RI/FS - RD/RA
Process
(40 CFR 300)

Project Management
Process
(DOE Order 4700.1)

Safety and Risk
Management
Process
(DOE Orders 5480.21,
5480.22 & 5480.23)

NEPA
Process
(10 CFR 1021 &
DOE Order 5440.1E)

WHC-SD-EN-TI-264, Rev. 0
Figure 2. Guidance for Simple
ER Projects at Hanford.

Figure 2. Guidance for Simple

ER Projects at Hanford.

1. Soil and solid waste excavation and management.
2. Surface and subsurface barriers and containment structures.

Guidance for Intermediate

Figure 3. Guidance for Intermediate ER Projects at Hanford.

Intermediate ER Projects at Hanford

Intermediate ER Projects May Include:

1. Soil and solid waste excavation and management.
2. Surface and subsurface barriers and containment structures.
3. Insitu treatment of contaminated soils and groundwater.

Guidance for Completing

Project Planning
and Authorization

Design Development/
System Engineering

Conceptual
Remedial Action
Selection

CERCLA
RI/FS - RD/RA
Process
(40 CFR 300)

Project Management
Process
(DOE Order 4700.1)

Safety and Risk
Management
Process
(DOE Orders 5480.21,
5480.22 & 5480.23)

NEPA
Process
(10 CFR 1021 &
DOE Order 5440.1E)

Figure 4. Guidance for Complex ER Projects at Hanford.

Complex ER Projects at Hanford

Once an assessment of the level of detailed design required and the appropriate level of management and oversight have been determined, the project can be assigned to the most appropriate complexity category. The RA Work Plan, Post-ROD treatability studies, and the RD design report efforts subsequently may be developed.

Simple ER projects (Figure 2) can usually be managed using only an RA Work Plan. The Work Plan serves as a comprehensive management and planning tool that provides the project time line and the step-by-step implementation plan for the RAs required. Simple ER projects that apply technologies commonly used at Hanford, involving straight forward construction methods that are familiar to both project managers and contractors, are best suited to implementation using only an RA Work Plan. In general, simple ER projects do not require post-ROD treatability studies. Examples of projects that may fall into the simple ER project category may include soil and solid waste excavation projects associated with low levels of worker risk, or surface and subsurface barrier and containment structures composed of single-component or multiple granular-component layers that do not often include complex composite layer systems.

Intermediate category projects (Figure 3) append an RD report to the RA Work Plan to produce a single integrated planning document. The RD report details the specific RA design(s) and includes plans, specifications, and a discussion of site specific implementation considerations. The Work Plan then provides the timeline and implementation plan associated with the RD. Projects ideally suited to this approach include those with more sophisticated technologies or those which require plans and specifications or stringent construction tolerances to assure that RA objectives will be achieved following implementation or construction. Projects requiring post-ROD treatability studies are usually included in either the intermediate or the complex project categories. Soil and solid waste excavation projects that involve higher worker risk of environmental exposure or that require complex environmental monitoring, as well as multi-component composite liner and cover systems, would also fall into this category. Simple in situ treatment systems requiring the straightforward use of single technologies may also be well suited to the intermediate ER project approach.

Complex projects (Figure 4) typically require division of the Work Plan into a separate RD report and a detailed RA Work Plan. Such a management approach is most appropriate when RAs are both large and complex, apply several sophisticated technologies, or use technologies that require multiple contractors working together under strict management and quality assurance oversight to achieve multiple RD objectives. ER projects that involve both excavation and construction of sophisticated composite barrier/cover systems, multiple-stage in-situ treatment of soils and groundwater, and ex-situ treatment of soils and groundwater within an operable unit are all candidates for management as a complex project. In addition, development of major centralized treatment, storage, or disposal facilities or any other project requiring coordination of multiple technologies and construction techniques across operable unit boundaries should be categorized as complex projects. Also, projects with complex post-ROD treatability studies are most often placed in the complex project category.

4.2 FLOW CHARTS

The simple, intermediate, and complex project flow charts define regulatory and project management processes based on CERCLA and NEPA requirements (regulatory), DOE Order 4700.1 *Project Management* requirements, and safety requirements based on DOE Orders 5480.21, 5480.22, and 5480.23. These processes are divided into project stages, including the following:

- Project planning and Authorization
- Design Development/System Engineering
- Conceptual Design Remedial Alternative Selection
- Preliminary and Detailed Design
- Contractor Selection
- Construction
- Project Acceptance and Testing
- Project Closeout.

The CERCLA, Project Management, Safety and Risk Management, and NEPA processes are incorporated into all project stages and divided into activities that are required by federal regulations or DOE Orders. Each flow chart identifies the major components of the project as well as the major stages of development.

4.3 FLOW CHART DESCRIPTIONS AND REFERENCES

Subsections 4.3 through 4.6 provide descriptions pertaining to the integration of NEPA, CERCLA, Project Management Process (DOE Order 4700.1), and Safety and Risk Management for RAs. The differences between simple, intermediate, and complex projects are noted in the descriptions of each project stage.

4.3.1 CERCLA Process Pre-RD/RA Activities

The following three sections are included to identify the steps leading to the development of the Preliminary and Detailed Design against which overall progress of the project can be objectively measured. These sections include Project Planning and Authorization, Project Development/System Engineering, and Conceptual Design/Remedial Alternative Selection. A summary of the preliminary steps will be included in the RD/RA manual to show the interfaces between the RD/RA and RI/FS processes.

4.3.1.1 Project Planning and Authorization. The project plan describes the overall strategy of the remediation process and establishes the project baseline against which progress can be objectively measured. The objective of the Remedial Investigation (RI) is to develop potential remedial alternatives which provide adequate protection to public health and the environment. The RI process involves identification of data gaps for recommendation of appropriate additional or supplemental studies. The Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01, Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER 1988), indicates the following suggested RI/FS Work Plan format:

Executive Summary

1. Introduction
2. Site Background and Setting
3. Initial Evaluation
 - Types and volumes of waste present
 - Potential pathways of contaminant migration/preliminary public health and environmental impacts
 - Preliminary identification of response objectives and RA alternatives
4. Work Plan Rationale
 - Data Quality Objectives needs
 - Work plan approach
5. RI/FS Tasks
6. Costs and key assumptions
7. Schedule
8. Project Management
 - Staffing
 - Coordination
9. References
10. Appendices

The Consent Agreement is a binding contract between the EPA and the Potentially Responsible Parties which stipulates how the cleanup actions will be conducted at a Superfund site. A TPA has been negotiated for the Hanford site between the DOE, the EPA, and Washington State Department of Ecology. There are no differences between the simple, intermediate, and complex projects in the Project Planning and Authorization stage.

Guidance documents for project planning and authorization:

Guidance for the RI/FS and selection of remedy under 40 CFR 300.430(a)(2).

Guidance for the Remedial Investigation is located in 40 CFR 300.430(d).

Guidance for the Feasibility Study is located in 40 CFR 300.430(e).

Guidance for the RI/FS Work Plan is located in OSWER Directive 9355.3-01 Section 2.3. (OSWER 1988).

4.3.1.2 Design Development/System Engineering. Documents to be developed during this phase include the following:

- Remedial Investigation Report
- Feasibility Study Report
- Pre-ROD Treatability Study.

The Remedial Investigation phase involves the collection of data to characterize site conditions, determine the nature of the waste, assess risk to human health and the environment, and conduct treatability testing as necessary to evaluate the potential performance and cost of the treatment technologies that are being considered. This includes specific activities such as defining the nature and extent of contamination (waste types, concentrations, and distributions) and identification of Federal/State ARARs

(Action-, Chemical-, and Location-Specific). The applicable baseline risk assessment and treatability studies are conducted at the same time. Within this section there are no differences between the simple, intermediate, and complex projects.

The Feasibility Study phase involves the development, screening, and detailed evaluation of alternative RAs and selection of the preferred remedy. Remediation goals are also established, as well as the results of any Treatability Study. The selection of the preferred alternative is determined through the application of nine evaluation criteria identified in the Detailed Analysis of Alternatives. These criteria are grouped by their importance. Each alternative must meet the following threshold criteria:

- Overall protection of human health and the environment
- Compliance with ARARs.

The analysis of alternatives is based upon the following primary balancing criteria:

- Long-term effectiveness
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost.

Modifying criteria that are evaluated following comment on the Proposed Plan (proposed ROD) and are addressed in the ROD are as follows:

- State acceptance
- Community acceptance.

Treatability studies are usually conducted during the remedial investigation and RD phase (40 CFR 300.430[d]). The objectives of treatability investigations are to provide sufficient data to allow a treatment alternative to be fully developed and evaluated during the feasibility study detailed analysis, to support the RD of a selected alternative, and to reduce cost and performance uncertainties for treatment alternatives to acceptable levels so that a remedy can be selected.

Guidance documents for Design Development/System Engineering:

Guidance for the Remedial Investigation is located in 40 CFR 300.430(d).

Guidance for the Feasibility Study is located in 40 CFR 300.430(e).

Guidance for Detailed Analysis of Alternatives criteria is located in 40 CFR 300.430(e)(9)(iii).

Efforts related to the preparation of RI Reports are identified in OSWER Directive 9355.3-01 Appendix B Task 8 (OSWER 1988) and Feasibility Study or RI/FS Reports.

Detailed Analysis of Alternatives are identified in OSWER Directive 9355.3-01 Appendix C Task 10 (OSWER 1988) as well as Section 6.

Treatability Investigations are identified in OSWER Directive 9355.3-01 Section 5 (OSWER 1988).

4.3.1.3 Conceptual Design/Remedial Alternative Selection. The purpose of conceptual design is to identify design requirements, project cost, and schedule information to identify financial, technical, and schedule requirements. Requirements of this phase include the following:

- Selection of the Preferred Alternative
- Proposed Plan
- Public Review and Comment
- Responsiveness Summary
- Pre-Design Report.

The selection of the preferred alternative is contingent upon the results from the application of the nine evaluation criteria against the proposed actions being undertaken. These criteria are utilized to determine the appropriate remedy and were discussed in Section 4.3.1.2.

The Proposed Plan, as discussed in 40 CFR 300.430(f)(2), is the mechanism by which the lead agency presents the selected alternative to the public. The plan should briefly describe the remedial alternatives analyzed by the lead agency, propose a preferred alternative, and summarize the information upon which the preferred alternative was selected. The purpose of the Proposed Plan is to summarize the RI/FS information and provide the public with a reasonable opportunity to comment on the preferred alternative, as well as alternative plans under consideration, and to participate in the selection of RAs at a site.

At a minimum, the Proposed Plan will do the following:

- Provide a brief summary description of the remedial alternatives evaluated in the detailed analysis
- Identify and provide a discussion of the rationale that supports the preferred alternative
- Provide a summary of any formal comments received from the support agency
- Provide a summary explanation of any proposed waiver identified from an ARAR.

The Proposed Plan will require revision should new information be made available that significantly changes the selected remedy with respect to either technical scope, performance, or cost.

The Proposed Plan will be issued to the public for review and comment as required by 40 CFR 300.430(f)(3). The lead agency will conduct the following activities:

- Publish a notice of availability and brief analysis of the Proposed Plan in a major local newspaper or general circulation

- Make the Proposed Plan and supporting information available in the Administrative Record.

A responsiveness summary shall be prepared that includes a written summary of significant comments, criticisms, and new relevant information submitted during the public comment period and the lead agency response to each issue. This summary will be made available with the ROD.

The Pre-Design Report is for describing the engineering parameters and institutional concerns of transferring the project to the lead design party.

The guidance for simple projects requires development of a conceptual design report in the Conceptual Design Remedial Alternative Selection stage, while the guidance for intermediate and complex projects requires a conceptual design report and a design criteria package.

All other management, safety, and NEPA activities are the same for all three project complexity classifications.

Guidance documents for Conceptual Design Remedial Alternative Selection:

Guidance for the selection of Preferred Alternative is identified in 40 CFR 300.430(f).

Guidance for the Proposed Plan, is located in 40 CFR 300.430(f)(2).

Public review and comment of the Proposed Plan is required by 40 CFR 300.430(f)(3) as well as the preparation of the Responsiveness Summary.

Guidance for preparation of the Pre-Design Report is located in OSWER Directive 9355.0-4A, Superfund Remedial Design and Remedial Action Guidance, Section 2 (OSWER 1988).

4.3.2 RD/RA Process

4.3.2.1 Preliminary Design. The RD/RA phase includes design and construction of the selected remedy. A Remedial Design Report (RDR) is required by the TPA and must provide the design for the remedy designated in the ROD.

Per the July 8, 1991 Federal Register, Vol. 56 No. 130, section, "Superfund Program; Model CERCLA RD/RA Consent Decree" (EPA 1991), the pre-final/final design submittal for the Remedial Action Work Plan (RAWP), which is analogous to the RDR, shall include, at a minimum, the following sections:

1. Final plans and specifications
2. Operation and Maintenance Plan
3. Construction Quality Assurance Project Plan
4. Field Sampling Plan (directed at measuring progress towards meeting Performance Standards)
5. Contingency Plan.

For simple projects, it is expected that detailed design will not be required. However, a RAWP will be developed to specify how project activities are to be implemented.

The development of intermediate projects will require an RDR and a RAWP. Since intermediate projects should not require an extensive amount of detailed design, it is anticipated that the RD/RA sections can be combined into one deliverable.

Complex projects will require the individual development of the RDR and the RAWP. These documents will be necessary due to the lead time associated with the collection of data required to support detailed design.

Guidance Documents for Preliminary Design:

The July 8, 1991 Federal Register, Vol. 56 No. 130, section; "Superfund Program; Model CERCLA RD/RA Consent Decree" (EPA 1991).

Guidance for the RD/RA, operation and maintenance is located in 40 CFR 300.430(d).

Guidance for RD is located in OSWER Directive 9355.0-4A, Section 2 (OSWER 1988).

4.3.2.2 Detailed Design. A RAWP is required by the TPA. This requirement may be modified by the ROD. The work plan will provide for constructing the remedy as set forth in the design plans. The work plan will typically include methodologies, plans, and schedules based upon the following:

- Schedule for completion of the RA
- Method for selection of the contractor
- Schedule for developing and submitting other required RA Plans
- Methodology for implementation of the Construction Quality Assurance Project Plan
- Groundwater monitoring plan
- Methods for satisfying permitting requirements
- Methodology for implementation of the O&M Plan
- Methodology for implementation of the Contingency Plan
- Tentative formulation of the RA team
- Construction quality control plan (by constructor)
- Procedures/plans for decontamination of equipment and disposal of contaminated materials.

The Model CERCLA Consent Decree also identifies requirements for the development of a RAWP. A listing of all activities for required methodologies, plans, and schedules should be included within the work plan.

CERCLA 120(e)(2) states that "substantial physical on-site remedial action shall be commenced at each facility not later than 15 months after completion of the investigation and study" for Federal Facilities. The EPA does not currently have a formal policy on implementation of this requirement. Implementation has been left to the Program Managers at each individual

Regional Office. As such, it would appear that compliance with the 15-month restriction is a negotiated item and will be determined on a site-by-site basis as part of the remedial agreements (e.g., ROD).

Guidance documents for Detailed Design:

The July 8, 1991 Federal Register, Vol. 56 No. 130, section; "Superfund Program; Model CERCLA RD/RA Consent Decree" (EPA 1991).

Guidance for the RD/RA, operation and maintenance is located in 40 CFR 300.430(d).

Guidance for RA is located in OSWER Directive 9355.0-4A, Section 3 (OSWER 1988).

4.3.3 Post RD/RA Activities

The following four sections are included to identify the supporting roles and the steps leading to project closeout. These sections include Contractor Selection, Construction, Project Acceptance and Testing, and Project Closeout.

4.3.3.1 Contractor Selection. The purpose of this task is to address the process for selection of subcontractors to work on Construction/RA projects at Hanford. Contractor selection involves the processes of awarding bids, selecting contractors, and evaluating cost proposals, as well as the management of subcontractors during the life of a project.

Guidance documents for Contractor Selection:

Guidance for bids is located in OSWER Directive 9355.0-4A, Section 3.2 (OSWER 1988).

4.3.3.2 Construction. The purpose of this section would be to identify the required actions to initiate construction and/or RA field work and identify key actions to the Project Manager.

4.3.3.3 Project Acceptance and Testing. This section identifies activities to be conducted during testing and verification of systems, components, or equipment. The purpose of this section is to address the methods of verifying acceptability for turnover and operation of a project that has been completed or is near completion. This section provides guidance to the Project Manager for the initiation, conduct, and completion of inspection, testing, and verification associated with project acceptance. The project acceptance and testing requirements/procedures would be specified in the RA Work Plan.

Guidance Document for Project Acceptance and Testing:

OSWER Directive 9355.0-4A, Section 3.4 (OSWER 1988) provides guidance for RA completion and acceptance.

4.3.3.4 Project Closeout. The Superfund Program; Model CERCLA Consent Decree indicates that within 90 days after the settling defendants conclude that all

phases of work (including O&M) have been fully performed, the settling defendants shall schedule and conduct a pre-certification inspection to be attended by the settling defendants and the EPA. If, after the pre-certification inspection, the settling defendants still believe that the work has been fully performed, the settling defendants shall submit a written report by the registered professional engineer stating that the work has been completed in full satisfaction of the requirements of this consent decree. The report shall contain a signed statement by a responsible corporate official of a settling defendant or the settling defendants' Project Coordinator.

Guidance document for Project Closeout:

OSWER Directive 9355.0-4A, Section 3.4 (OSWER 1988) provides guidance for site closeout.

4.4 PROJECT MANAGEMENT PROCESS DOE ORDER 4700.1

4.4.1 Pre-Title I/II Activities

The following three sections identify the supporting roles and detail the preliminary steps leading to the development of the Preliminary and Detailed Design. These sections include Project Planning and Authorization, Design Development/System Engineering, and Conceptual Design/Remedial Alternative Selection.

4.4.1.1 Project Planning and Authorization. The project plan describes the overall strategy of the remediation process and establishes the project baseline against which the progress and effectiveness of its management shall be measured. Project plans can include the following:

- Project Objectives
- Project Management Plan
- Acquisition Strategy
- Cost/Schedule/Scope or Technical Baselines
- Work Breakdown Structure.

Guidance documents for project planning and authorization:

The Establishment of the Baselines is outlined in DOE Order 4700.1 Chapter III under "requirements."

Guidance for preparing a Project Management Plan is located in DOE Order 4700.1 Change I Attachment II-4 page II-63.

The Work Breakdown Structure is detailed in DOE Order 4700.1 Chapter II Part B.

4.4.1.2 Design Development/System Engineering. The purpose of this task is to provide information to the Project Manager on the relationship of design criteria documents to the overall project management process, and to assist

the Project Manager in the development and review of design criteria documentation. These tasks are applicable to any project involving the level of sophistication where conceptual design reports and subsequent design criteria packages are needed to develop the basis for more detailed design activities. Functional design criteria details the functional parameters that the project must meet. These parameters include functional requirements, functional design criteria, and functional regulatory bases which can be combined into a single document.

Systems Engineering involves detailing a sequence of activities and decisions that transforms an identified mission need into a description of system performance parameters and a preferred system configuration. Systems Engineering's goal is to ensure that products satisfy their functional requirements, operate effectively in their intended environment, and demonstrate a level of performance and reliability that justifies the investment.

Guidance documents for Design Development/System Engineering:

Systems Engineering is outlined in DOE Order 4700.1 Chapter III under Part B.

System Acquisition and Major Key Decisions are identified in DOE Order 4700.1 Chapter I Change 1 Figure I-5.

Design Criteria Package Checklist is identified in DOE Order 4700.1 Chapter V page 77.

Ref. Attachment III-1(6)(a) & (b) for Evaluation of Designs.

Ref. V-C.c; V-C.2.e(a); Attachment III-1,1(6)(b)1 for the Tradeoff (Preliminary) Study.

4.4.1.3 Conceptual Design/Remedial Alternative Selection. Conceptual Design is the formative engineering stage in the design of a system, process, or facility. The conceptual design is prepared for the purpose of developing and quantifying the physical construction requirements of the project, a cost estimate, and a schedule of key design and construction activities. Conceptual design is based upon user requirements established and accepted by management. It establishes the location, size, capacity, and functional need of the project. Conceptual design encompasses efforts to do the following:

- a. Develop a project scope that will satisfy program needs
- b. Assure project feasibility and attainable performance levels
- c. Develop reliable cost estimates and realistic schedules in order to provide a complete description of the project for congressional consideration
- d. Develop project criteria and design parameters for all engineering disciplines, identification of applicable codes and standards, quality assurance

requirements, environmental studies, materials of construction, space allowances, energy conservation features, health/safety, safeguards, security requirements, and any other features or requirements necessary to describe the project.

Conceptual design summarizes the information assembled during the preliminary engineering phase of a project, which lasts from the preparation of project scoping documentation to the initiation of Title I design. This task is applicable to the phase of any project involving the development of project authorization and the preparation of design criteria. The objective of this documentation is to identify the planning, approval, and scoping of a project leading up to the initiation of preliminary (Title I) design.

Design criteria represents the technical data and other project information developed during project identification and planning, conceptual design, and preliminary design phases. These criteria define the project scope; field activity features and requirements, and design parameters; applicable design codes, standards and regulations; applicable health, safety, and environmental directives; requirements for fire protection, safeguards, security, and energy conservation; project quality assurance constraints; and other pertinent criteria. Project design criteria are consolidated into documents which reflect specific stages of development during the conduct of a project.

Guidance documents for Conceptual Design Remedial Alternative Selection:

Conceptual design is outlined in DOE Order 4700.1 (Change 1) Chapter V (V-91) and Conceptual Design Reports are identified in (V-95).

Ref. V-B.3.b; Attachment V-8, V-9, V-10 for Conceptual Design Report.

Ref. V-A.2.i & j; Attachment V-3 for Design Criteria Package.

4.4.2 Preliminary and Detailed Design

The purpose of this section is to identify the key elements and activities necessary for development of the project design.

4.4.2.1 Preliminary Design. The design process is divided into the following two phases: Preliminary Design (Title I) and Detailed Design (Title II). The Preliminary (Title I) design is a strategic element in the development of the project design. The purpose of the Title I design phase is to utilize the design basis (conceptual design and/or design criteria) to firmly set the project scope and features and further develop the project cost and schedule.

The Title I design phase of a DOE Order 4700.1 project is equivalent to the preliminary design phase that is associated with projects that are

driven by regulatory requirements such as CERCLA, Resource Conservation and Recovery Act, and NEPA.

Title I Design (Preliminary Design) expands on the conceptual design and the project design criteria as a basis for project development. Title I design determines the requirements and criteria which will govern the Title II (detailed) design. Tasks include preparation of preliminary planning and engineering studies, preliminary drawings and outline specifications, life-cycle cost analysis, preliminary cost estimates, and scheduling for project completion. Preliminary design provides identification of long lead procurement items and analysis of risks associated with continued project development. Generally, the design effort is considered 60% complete at the end of Title I design.

Guidance Documents for Preliminary Design:

A summary is provided and Title I Design is outlined in DOE Order 4700.1 Chapter V under Part C (V-34).

Title I Design summary is outlined in DOE Order 4700.1 Chapter V (V-99).

Doe Order 5700.6C "Quality Assurance", August 21, 1991.

Doe Order 6430.1A "General Design Criteria", April 6, 1989.

4.4.2.2 Detailed Design. Title II (Detailed design) completes the design phase of a project and allows for the beginning of the construction phase. Title II utilizes the approved Title I design and the revised project design criteria as the design basis. Drawings and specifications for procurement and construction are finalized. Necessary construction, labor, equipment, and material quantities are estimated. Detailed cost estimates, procurement schedules, and construction schedules are also developed. Upon completion of Title Design, all data is compiled in a construction bid package.

Guidance documents for Detailed Design:

Title II Design is outlined and a summary is provided in DOE Order 4700.1 Chapter V under Part C (V-40).

Doe Order 5700.6C "Quality Assurance", August 21, 1991.

Doe Order 6430.1A "General Design Criteria", April 6, 1989.

4.4.3 Post-Title I/II Activities (Title III Services)

The following four sections are included to identify the supporting roles and steps leading to project closeout. These sections include Contractor Selection, Construction, Project Acceptance and Testing, and Project Closeout.

4.4.3.1 Contractor Selection. The evaluation of all proposals submitted in response to an Issue For Bid or Request For Proposal will be accomplished by engineers and/or other technical personnel. Such evaluations have two

purposes: 1) to determine whether the contractor's proposed labor/material estimates will properly meet the performance/schedule objectives of the contract, and 2) to evaluate the cost of the specific elements and tasks put forward by the contractor. Analysis by technical personnel includes a qualitative and quantitative evaluation of such elements as labor hours, materials, computer usage, travel expenditures, and other direct charges as appropriate.

4.4.3.2 Construction. The purpose of this task is to address the actions required to initiate and conduct field work. This section should provide information involved with commencement of work and identifies key actions of importance to the Project Manager.

Title III Services are support activities required to assure that a project is constructed in accordance with its plans and specifications and that the quality of materials and workmanship is consistent with the requirements of the project. During construction activities, as-built records shall be maintained to reflect the as-built conditions.

Guidance documents for Construction:

Construction Project Planning is identified in DOE Order 4700.1 (Change 1) Chapter V Part B.

Construction Management is identified in DOE Order 4700.1 Chapter V (V-67).

Inspection (Title III) is identified in DOE Order 4700.1 Chapter V (V-52).

4.4.3.3 Project Acceptance and Testing. This section provides the activities to be conducted during testing and verification of systems, components, or equipment. The purpose of this task is to address the methods of verifying acceptability for turnover and operation of a project that has been completed or is near completion. This section provides guidance to the Project Manager for the initiation, conduct, and completion of inspection, testing, and verification associated with project acceptance.

Construction acceptance tests are performed under contract by the Construction Manager to ensure that components and items are operable and have been furnished and/or installed in accordance with approved drawings and specifications. Although construction acceptance testing often involves hydrostatic testing, continuity checks, bumping motors, and leak tests, more involved testing may be required as well.

Guidance Document for Project Acceptance and Testing:

DOE Order 4700.1 Chapter V (V-58) identifies Acceptance of completed facilities and (V-60) identifies acceptance Testing of Equipment.

4.4.3.4 Project Closeout. The closeout of a project involves a number of steps required to ensure the proper termination of project activities. These steps include the completion of all contractual relationships; the closing of contracts for file; closing out financial records and documents; obtaining necessary approvals, licenses, and permits; completing the safety analysis

reports; establishing operating procedures; and other activities peculiar to the project. Preparation of a project closeout checklist is recommended to assist the Project Manager in verifying completion of all closeout activities.

Guidance documents for Project Closeout:

Construction Completion Report Content is identified in DOE Order 4700.1 Chapter V (V-103).

Cost Data is identified in DOE Order 4700.1 (Change 1) Chapter V (V-107).

Guidance for O&M is located in 40 CFR 300.435(f).

4.5 SAFETY ANALYSIS PROCESS FOR RD/RA.

The Safety Analysis Process is initiated early in the planning to determine the potential authorization requirements and necessary resources to support the project. The Safety Analysis Process provides analytical support necessary to plan, engineer, and operate RD/RA projects and the documentation required to support authorization decisions. The process also incorporates the analytical and hazard control commitments of Occupational Safety and Health Administration and EPA that are applicable to DOE managed RD/RA projects. The scope of hazard managed through the Safety Analysis Process include nuclear classifications consistent with DOE Orders 5480.21, 5480.22, 5480.23, and 5480.24. Non-nuclear hazards (radiological and hazardous materials) are managed through the Safety Analysis Process consistent with the requirements and guidance applicable to DOE Order 5481.1B. The "Westinghouse GOCO, Environmental Restoration and Decontamination and Decommissioning Safety Documentation Guidance" (SRT-EAG-93-00) document records the integration of the requirements for the ER program. The "General Safety Basis Development Guidance for Environmental Restoration, Decontamination and Decommissioning" (WHC-EP-0726) provides technical and process guidance appropriate for the unique conditions in the ER program.

Guidance documents for Safety Analysis:

J. E. Hansen (WSRC), N. R. Kerr (WHC), and L. H. Frauenholz (WINCO), *Westinghouse GOCO ER and D&D Safety Documentation Guidance*, SRT-EAG-93-00, March 18, 1994.

D. R. Ellingson (WHC), K. Bohlander (EG&G Rocky), J. E. Hansen (WSRC), W. K. Crowley (MMES ORNL) and N. R. Kerr (WHC), *General Safety Basis Development Guidance for Environmental Restoration, Decontamination and Decommissioning*, WHC-EP-0726, February 1994. (WHC-EP-0726 is a consensus guidance developed with the input of many M&Os through the DOE sponsored *Energy Facility Contractors Group*.)

4.6 NEPA PROCESS 10 CFR 1021 & DOE ORDER 5440.1E

4.6.1 Pre-RD/RA Activities

A Program Level Environmental Impact Statement (EIS) is being developed for the ER program at Hanford to identify the range of RAs that may be taken at the site. This Program Level EIS will be supplemented as required to comply with NEPA requirements. It is important to monitor the development of NEPA studies and the associated documentation. The NEPA Process is conducted concurrently with the RI/FS process, and involves the evaluation of the NEPA requirements for the specific activity, preparation of the appropriate documentation, and review and approval of the NEPA documents. It is assumed that an EIS will not be required for individual projects taken pursuant to the TPA.

There are NEPA exemptions for those projects exceeding the time and dollar limits that allow the use of a Categorical Exclusion (CATEX) for NEPA compliance. In other instances, it may be necessary to prepare an Environmental Assessment (EA). The EA or CATEX is submitted for review. Upon approval, the NEPA Group will prepare and transmit a draft Finding of No Significant Impact (FONSI).

The NEPA Process is conducted concurrently with the RI/FS process, and involves the following elements:

1. Request NEPA Group Services
2. Evaluate NEPA requirements
3. Prepare Action Description Memorandum or CATEX
 - Is NEPA action required?
 - Can project be accommodated by a CATEX?
4. Prepare NEPA EA
 - Is EA sufficient?
 - Is EIS required?
5. Complete the preparation of the RI/FS Work Plan
6. Prepare FONSI or develop Mitigation Action Plan.

Details on the NEPA process, NEPA documentation requirements, and the integration of NEPA requirements into the CERCLA Remedial Activity process are presented in DOE Order 5400.4.

It is anticipated that a CATEX can be obtained for the simple ER projects. For intermediate ER projects, a determination will have to be made whether to pursue a CATEX or prepare an Action Description Memorandum which will lead to the development of additional documents. For the complex projects, it has been assumed that a CATEX will not be obtained, therefore an Action Description Memorandum will be prepared followed by the appropriate documents.

Guidance documents for NEPA compliance:

DOE Order 5440.1E, National Environmental Policy Act Compliance Program.

10 CFR 1021, National Environmental Policy Act.

4.7 POLICY MANUAL AND DESIGN PHASE PROCEDURE MATRICES

Table 2 is a matrix that cross references the specific project phases, regulatory categories and activities identified in the flow charts provided as Figures 1 through 4 against the applicable WHC project management and/or safety/risk management policies and procedures manuals. Areas in which procedural coverage may potentially be inadequate are identified as [TBD (To Be Determined)]. Table 3 addresses only the Design Development/ System Engineering, Conceptual Design/Remedial Alternative Selection, and Preliminary and Detailed Design phases, and expands the level of detail to address specific manual sections or procedures. Wherever potential procedural inadequacies have been observed, they have been noted as [TBD] as previously stated.

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 1 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Project Planning and Authorization	CERCLA Process (40 CFR 300)	• Negotiate Consent Agreement, update as required	RL-TP-90-001	
		• Prepare Work Plans	WHC-CM-2-17 WHC-CM-6-2 WHC-CM-7-5 WHC-CM-7-7 WHC-CM-8-7 WHC-CM-8-8	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-33 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-4-46 WHC-CM-6-30 (200 Areas only) WHC-CM-6-32
	DOE 4700.1 Project Management Process	• Establish Project Baseline, prepare Project Management Plan	WHC-CM-2-17 WHC-CM-6-2 WHC-CM-6-12 WHC-CM-7-5 WHC-CM-7-7 WHC-CM-8-7 WHC-CM-8-8	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-33 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-6-30 (200 Areas only) WHC-CM-6-32
		• Prepare Work Breakdown Structure	WHC-CM-8-8	
	DOE 5480.21, .22, .23 Safety/Risk Management	• Conduct hazard analysis, prepare document	WHC-CM-6-1	WHC-CM-4-46 WHC-CM-6-32

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 2 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Project Planning and Authorization (cont.)	NEPA Process (10 CFR 211 and DOE Order 5440.1E)	• Determine if NEPA evaluation is required	WHC-CM-7-5	
		• Evaluate NEPA requirements	WHC-CM-7-5	
		• Prepare NEPA checklist	WHC-CM-7-5	
Design Development/System Engineering	CERCLA Process (40 CFR 300)	• RI report review and analysis	WHC-CM-3-10 WHC-CM-6-1	
		• FS report review and analysis	WHC-CM-3-10 WHC-CM-6-1	
		• Pre-ROD treatability studies (optional)	WHC-CM-2-14 WHC-CM-4-8 WHC-CM-5-3 WHC-CM-5-16 WHC-CM-6-1 WHC-CM-6-2 WHC-CM-7-5 WHC-CM-8-7 WHC-CM-8-8	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-33 WHC-CM-4-40 WHC-CM-4-41

Table 3. RD/RA Design/Remedial Action Program Requirements and
Implementing Document Matrix. (sheet 3 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Design Development/System Engineering (Cont.)	DOE 4700.1 Project Management Process	• Evaluate and optimize system requirements; acquire and evaluate design input data	WHC-CM-3-10 WHC-CM-6-1	
		• Evaluate designs, prepare functional design criteria	WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-12	WHC-CM-1-6 WHC-CM-4-9 WHC-CM-4-11 WHC-CM-4-46
	DOE 5480.21, .22, .23 Safety/Risk Management Processes	• Perform risk analysis, prepare Risk Management Plan	WHC-CM-3-10 WHC-CM-6-1 WHC-CM-4-46	WHC-CM-6-32
	NEPA Process (10 CFR 1021, DOE Order 5440.1E)	• Prepare categorical exclusion document or action description memorandum	WHC-CM-7-5	
		• Assess anticipated level of significance	WHC-CM-7-5	

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 4 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Conceptual Design/Remedial Alternative Selection	CERCLA Process (40 CFR 300)	• Develop RD/RA Plan	WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-12 WHC-CM-7-5 WHC-CM-7-6	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-4-46
		• Issue RD/RA plan for public review and comment	WHC-CM-3-4	
		• Prepare pre-design report	WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-12	
		• Prepare responsiveness summary	WHC-CM-3-4	
	DOE 4700.1 Project Management Process	• Develop conceptual design report	WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-12	WHC-CM-1-6 WHC-CM-4-9 WHC-CM-4-11 WHC-CM-4-41 WHC-CM-4-46 WHC-CM-6-32
		• Develop cost estimate and construction schedule	WHC-CM-2-17 WHC-CM-6-2	

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 5 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Conceptual Design/Remedial Alternative Selection (Cont.)	DOE 5480.21, .22, .23 Safety/Risk Management Processes	• Safety Assessment (simple ER projects only) or prepare Preliminary Operational Safety Analysis Report (complex and intermediate ER projects only)	WHC-CM-6-1 WHC-CM-6-2	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-4-46 WHC-CM-6-32
	NEPA Process (10 CFR 1021 and DOE Order 5440.1E)	• Prepare EA	WHC-CM-7-5	
		• Submit EA for public review and comment	WHC-CM-3-4	
		• Prepare and issue FONSI and Mitigation Action Plan, as required	WHC-CM-7-5	
		• Prepare EIS	WHC-CM-7-5	
		• Submit EIS for public review and comment	WHC-CM-3-4	
		• Update Mitigation Action Plan	WHC-CM-7-5	

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 6 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Preliminary and Detailed Design	CERCLA Process (40 CFR 300)	• Prepare RD report (complex and intermediate ER projects only), prepare RA Work Plan	WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-12	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-46 WHC-CM-6-32
		• Conduct Post-ROD treatability studies (optional, for intermediate and complex ER projects)	WHC-CM-2-14 WHC-CM-4-8 WHC-CM-5-3 WHC-CM-5-16 WHC-CM-6-1 WHC-CM-6-2 WHC-CM-7-5 WHC-CM-8-7 WHC-CM-8-8	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-33 WHC-CM-4-40 WHC-CM-4-41
	DOE 4700.1 Project Management Process	• Prepare Performance Specifications (simple ER projects only) or Prepare Title I/II Design Documents (complex and intermediate ER projects only)	WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-12 WHC-CM-8-9	WHC-CM-1-6 WHC-CM-4-9 WHC-CM-4-11 WHC-CM-4-46
		• Prepare long-lead procurement specifications (complex ER projects only)	WHC-CM-2-1 WHC-CM-4-8 WHC-CM-6-1 WHC-CM-6-2	

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 7 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Preliminary and Detailed Design (cont.)	DOE 4700.1 Project Management Process (cont.)	• Issue long-lead RFPs (complex ER projects only)	WHC-CM-2-1	
	DOE 5480.21, .22, .23 Safety/Risk Management Processes	• Prepare Final Operational Safety Analysis Report (complex and intermediate ER projects only)	WHC-CM-6-1 WHC-CM-6-2	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-4-46 WHC-CM-6-32
Contractor Selection	CERCLA Process (40 CFR 300)	• Award work to RA contractor	WHC-CM-2-1 WHC-CM-4-8	
	DOE 4700.1 Project Management Process	• Complete all required procurement actions, issue contracts/POs	WHC-CM-2-1 WHC-CM-4-8	
	DOE 5480.21, .22, .23 Safety/Risk Management Processes	• Prepare Construction Health and Safety Plan		WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-6-30 (200 Areas only) WHC-CM-6-32

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 8 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Construction	CERCLA Process (40 CFR 300)	<ul style="list-style-type: none"> Implement RA 	WHC-CM-2-2 WHC-CM-2-3 WHC-CM-2-5 WHC-CM-2-14 WHC-CM-4-28 WHC-CM-5-3 WHC-CM-5-16 WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-10 WHC-CM-6-12 WHC-CM-7-5 WHC-CM-7-6 WHC-CM-7-7 WHC-CM-8-7 WHC-CM-8-8 WHC-CM-8-9	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-6-30 (200 Areas only)

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 9 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Construction (cont.)	DOE 4700.1 Project Management	<ul style="list-style-type: none"> Perform all required Title III activities 	WHC-CM-2-1 WHC-CM-2-2 WHC-CM-2-3 WHC-CM-2-14 WHC-CM-4-28 WHC-CM-5-3 WHC-CM-5-16 WHC-CM-6-1 WHC-CM-6-2 WHC-CM-6-10 WHC-CM-6-12 WHC-CM-7-5 WHC-CM-7-6 WHC-CM-7-7 WHC-CM-8-7 WHC-CM-8-8 WHC-CM-8-9	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-10 WHC-CM-4-11 WHC-CM-4-33 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-6-30 (200 Areas only)
	DOE 5480.21, .22, .23 Safety/Risk Management Processes	<ul style="list-style-type: none"> Prepare for Operational Readiness Review; train all personnel in HASP, Safety SOPs (intermediate and complex ER projects only) 	WHC-CM-6-2 WHC-CM-7-6	WHC-CM-1-6 WHC-CM-4-3 WHC-CM-4-11 WHC-CM-4-33 WHC-CM-4-40 WHC-CM-4-41 WHC-CM-4-43 WHC-CM-6-30 (200 Areas only) WHC-CM-6-32

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 10 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Project Acceptance and Testing	CERCLA Process (40 CFR 300)	• Verification of ROD goals	WHC-CM-4-8 WHC-CM-6-2 WHC-CM-7-6	
	DOE 4700.1 Project Management Process	• Construction acceptance testing • System operation testing (complex and intermediate ER projects only)	WHC-CM-4-8 WHC-CM-6-2	
	DOE 5480.21, .22, .23 Safety/Risk Management Processes	• Conduct Operational Readiness Review	WHC-CM-6-2 WHC-CM-7-6	
		• Conduct periodic H&S Compliance Audits		Industrial Safety Manual Radiological Control Manual Nuclear Safety Manual WHC-CM-4-3 WHC-CM-4-6 WHC-CM-6-32
Project Closeout	CERCLA Process (40 CFR 300)	• Submit project data	WHC-CM-2-6 WHC-CM-3-4 WHC-CM-6-2 WHC-CM-6-12 WHC-CM-7-5	
	DOE 4700.1 Project Management Process	• Closeout Construction Contracts	WHC-CM-2-1 WHC-CM-6-2 WHC-CM-6-12	

Table 3. RD/RA Design/Remedial Action Program Requirements and Implementing Document Matrix. (sheet 11 of 11)

Project Phase	Regulatory Category Process	Project Activity	Applicable Project Management Policy/Procedure Manuals ¹	Applicable Safety/Risk Management Policy/Procedure Manuals
Project Closeout (Cont.)	DOE 4700.1 Project Management Process	<ul style="list-style-type: none"> Initiate operations and maintenance activities (intermediate and complex ER projects only) 	WHC-CM-6-1 WHC-CM-6-2 WHC-CM-8-7 WHC-CM-8-8	

¹WHC-CM-1-3, WHC-CM-1-4, WHC-CM-1-5, WHC-CM-2-5, WHC-CM-2-15, WHC-CM-4-1, AND WHC-CM-4-2 apply categorically, to the extent applicable for each activity type. WHC-CM-3-5 and WHC-CM-3-6 apply to all activities resulting in the production and/or publication of a controlled document.

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 1 of 14)

Project Phase	Design Development/ System Engineering	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
	CERCLA Process (40 CFR 300)	• RI report review and analysis • FS report review and analysis • Pre-ROD treatability studies (optional)	WHC-CM-3-10	WHC-CM-6-1	EP-1.11/EPG-1.11, EP-4.1/EPG-4.1, App. F
			WHC-CM-3-10	WHC-CM-6-1	SP-4.2
			WHC-CM-2-14	WHC-CM-4-8	Part II and Parts III or IV, depending on the hazards associated with treatability test material and location of test facility
			WHC-CM-5-3	WHC-CM-5-16	all applicable sections, depending on type of analyses required
			WHC-CM-5-3	WHC-CM-5-16	Section 1.0 and 2.0, depending on hazards associated with treatability test wastes and location of test facility
			WHC-CM-6-1	WHC-CM-6-1	EP-1.12/EPG-1.12, EP-4.1/EPG-4.1, EP-4.2/EPG-4.2; App's K,N,O,P
			WHC-CM-4-8	WHC-CM-4-8	QAI 11.1
			WHC-CM-5-3	WHC-CM-5-3	all applicable sections, depending on type of analyses required
			WHC-CM-5-16	WHC-CM-5-16	Section 1.0 and 2.0, depending on hazards associated with treatability test wastes and location of test facility
			WHC-CM-6-1	WHC-CM-6-1	EP-1.12/EPG-1.12, EP-4.1/EPG-4.1, EP-4.2/EPG-4.2; App's K,N,O,P

58

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 3 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Design Development/ System Engineering (Cont.)	CERCLA Process (40 CFR 300; Cont.)	• Pre-ROD treatability studies (optional) (Cont.)	WHC-CM-4-11	Sections 6.0, 7.0, App's B, C, E, G, depending on test location and hazards associated with tests
			WHC-CM-4-33	all sections, when testing activities performed on site and radiological hazards are present in test materials or wastes
			WHC-CM-4-40	all relevant sections, depending on test location and radiological and other hazards associated with testing activities
			WHC-CM-4-41	hazards are present in material wastes, depending on test location and associated safety hazards
	DOE 4700.1 Project Management Process	• Evaluate and optimize system requirements; acquire and evaluate design input data	WHC-CM-3-10	SP-4.2
			WHC-CM-6-1	EP-1.11/EPG-1.11, EP-4.1/EPG-4.1, App.F
		• Evaluate designs, prepare functional design criteria	WHC-CM-6-1	EP-1.11/EPG-1.11, App. D, F,G
			WHC-CM-6-2	PM-1, PM-2, PM-3, PM-4, PM-5, PM-13, PM-14, PM-22, PM-26

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 4 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Design Development/ System Engineering (Cont.)	DOE 4700.1 Project Management Process (Cont.)	<ul style="list-style-type: none"> Evaluate designs, prepare functional design criteria (Cont.) 	WHC-CM-6-12	P-10, P-20
			WHC-CM-4-9	all relevant sections, depending on presence or absence of radiological hazard considerations
			WHC-CM-1-6	Sections 2, 3, 4, depending on presence or absence of radiation protection needs
			WHC-CM-4-11	Sections 6.0, 7.0; App's B, C, E, G, depending on radiological and other safety hazards associated with the design
			WHC-CM-4-46	all sections
	DOE 5480.21, .22, .23 Safety/Risk Management Processes	<ul style="list-style-type: none"> Perform risk analysis, prepare Risk Management Plan 	WHC-CM-3-10	SP-4.2
			WHC-CM-6-1	EP-1.12/EPG-1.12, App. A
			WHC-CM-4-46	all sections
			[TBD? Operating Safety Risk Analysis/Risk Management Plan Preparation]	
Conceptual Design/ Remedial Alternative Selection	CERCLA Process (40 CFR 300)	<ul style="list-style-type: none"> Develop RD/RA Plan 	WHC-CM-6-1	EP-1.12/EPG-1.12, App. A
			WHC-CM-6-2	PM-7, PM-13

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 5 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Conceptual Design/ Remedial Alternative Selection (Cont.)	CERCLA Process (40 CFR 300; Cont.)	• Develop RD/RA Plan (Cont.)	WHC-CM-6-12	P-10, P-20
			WHC-CM-7-5	Sections 2.0, 3.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, and 14.0 (if high-level wastes are present)
			WHC-CM-4-3	HWO-1, HWO-3; HWO-2 if RA includes development of RCRA TSD facility
			WHC-CM-1-6	Sections 2, 3, 4, 5, depending on radiation protection needs of the RA
			WHC-CM-4-11	Sections 6.0, 7.0; App's B, C, E, G, depending on the radiation protection and other safety needs associated with the RA
			WHC-CM-4-40	all relevant sections, depending on safety hazards associated with the RA
			WHC-CM-4-41	Sections 3, 4, 5, 6, 7, depending on the fire protection needs associated with the RA
			WHC-CM-4-43	all applicable sections, depending on site location of RA
			WHC-CM-4-46	all sections

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 6 of 14)

Project Phase	Regulatory Category Process¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals²	Applicable Manual Sections or Procedures
Conceptual Design/ Remedial Alternative Selection (Cont.)	CERCLA Process (40 CFR 300; Cont.)	• Develop RD/RA Plan (Cont.)	WHC-CM-7-6	Sections 4.0 through 12.0
		• Issue RD/RA plan for public review and comment	WHC-CM-3-4	IRA-1.2, IRA-1.3, IRA-1.4, IRA-1.5, IRA-2.1, IRA-2.4
		• Prepare pre-design report	WHC-CM-6-1	EP-1.11/EPG-1.11, EP-1.12/EPG-1.12, App. F
			WHC-CM-6-2	PM-6
			WHC-CM-6-12	P-10, P-20
	DOE 4700.1 Project Management Process	• Prepare responsiveness summary	WHC-CM-3-4	IRA-1.2, IRA-1.3, IRA-1.4, IRA-1.5, IRA-2.1, IRA-2.4
		• Develop conceptual design report	WHC-CM-6-1	EP-1.11/EPG-1.11, EP-1.12/EPG-1.12, App.D,E,F
			WHC-CM-6-2	PM-6, PM-13
			WHC-CM-6-12	P-10, P-20
			WHC-CM-4-9	all relevant sections, depending on radiological hazards associated with the RA
			WHC-CM-1-6	Sections 2, 3, 4 and 5, depending on the radiation protection needs associated with the RA

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 7 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Conceptual Design/ Remedial Alternative Selection (Cont.)	DOE 4700.1 Project Management Process (Cont.)	• Develop conceptual design report	WHC-CM-4-11	Sections 6.0, 7.0, App's B, C, E, G, depending on the radiological and the safety hazards associated with the RA
			WHC-CM-4-41	Sections 3, 4, 7
			WHC-CM-4-46	all sections
		• Develop cost estimate and construction schedule	WHC-CM-6-2	PM-8, PM-9, PM-10
			WHC-CM-2-17	Sections 2 through 9, 11, 12
	DOE 5480.21, .22, .23 Safety/Risk Management Processes	• Safety Assessment (simple ER projects only) or Prepare Preliminary Operational Safety Analysis Report (complex and intermediate ER projects only)	WHC-CM-6-1	EP-1.11/EPG-1.11 or EP- 1.12/EPG-1.12, App. F
			WHC-CM-6-2	PM-10, PM-18, PM-23
			WHC-CM-4-3	Sections HWO-1, HWO-3
			WHC-CM-1-6	Sections 2, 3, 4, and 5, depending on the radiation protection needs associated with the RA
			WHC-CM-4-11	Sections 6.0, 7.0, App's B, C, E, G, depending on the radiological and other safety hazards associated with the RA

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 8 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Conceptual Design/ Remedial Alternative Selection (Cont.)	DOE 5480.21, .22, .23 Safety/Risk Management Processes	<ul style="list-style-type: none"> Safety Assessment (simple ER projects only) or Prepare Preliminary Operational Safety Analysis Report (complex and intermediate ER projects only) (Cont.) 	WHC-CM-4-40	all relevant sections, depending on the safety hazards associated with the RA
			WHC-CM-4-41	3, 4, 5, 6, and 7, depending on the fire hazards associated with the RA
			WHC-CM-4-43	all applicable sections, depending on site location of RA
			WHC-CM-4-46	all sections
			[TBD? Safety Assessment/Operational Safety Analysis Report Requirements for Intermediate/Complex ER Projects]	
Preliminary and Detailed Design	CERCLA Process (40 CFR 300)	<ul style="list-style-type: none"> Prepare RD report, (complex and intermediate ER projects only), prepare RA Work Plan 	WHC-CM-6-1	EP-1.11/EPG-1.11, EP-1.12/EPG-1.12, App's. A and F
			WHC-CM-6-2	PM-7
			WHC-CM-6-12	P-10, P-20
			WHC-CM-4-3	Sections HWO-1, HWO-3
			WHC-CM-1-6	Sections 2, 3, 4, 5, depending on the radiation protection needs of the RA

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 9 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Preliminary and Detailed Design (Cont.)	CERCLA Process (40 CFR 300; Cont.)	<ul style="list-style-type: none"> • Prepare RD report, (complex and intermediate ER projects only), prepare RA Work Plan • Conduct Post-Rod treatability studies (optional, for intermediate and complex ER projects) 	<p>WHC-CM-4-11</p> <p>Sections 6.0, 7.0; App's B, C, E, G, depending on radiological and other safety hazards associated with the RA</p> <p>WHC-CM-4-40</p> <p>all relevant sections, depending on the safety hazards associated with the RA</p> <p>WHC-CM-4-41</p> <p>Sections 3, 4, 5, 6, 7, depending on the fire hazards associated with the RA.</p> <p>WHC-CM-4-43</p> <p>all applicable sections, depending on the site location of the RA</p> <p>WHC-CM-4-46</p> <p>all sections</p> <p>WHC-CM-2-14</p> <p>Part II and Parts III or IV, depending on hazards associated with test materials and testing residues</p> <p>WHC-CM-4-8</p> <p>QAI 11.1</p> <p>WHC-CM-5-3</p> <p>all applicable sections, depending on type of analyses required</p>	

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 10 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Preliminary and Detailed Design (Cont.)	CERCLA Process (40 CFR 300; Cont.)	<ul style="list-style-type: none"> Conduct Post-Rod treatability studies (optional, for intermediate and complex ER projects) 	WHC-CM-5-16	Sections 1.0 and 2.0, depending on hazards associated with test treatability wastes and location of test facility
			WHC-CM-6-1	EP-1.12/EPG-1.12, EP-4.1/EPG-4.1, EP-4.2/EPG-4.2, App's.K,N,O,P
			WHC-CM-6-2	PM-1, PM-2, PM-3, PM-8, PM-9 (if study performed by off-site A-E), PM-10, PM-13, PM-15, PM-23, PM-26
			WHC-CM-7-5	Sections 3.0 and 7.0 (depending on hazards associated with test materials or wastes), 10.0, 11.0
			WHC-CM-8-7	Sections 220, 503, and relevant portions of 700, depending on location and support needs of specific treatability tests
			WHC-CM-8-8	JCS-3, JCS-4, JCS-5, JCS-6, JCS-7 (as applicable, depending on location of testing activities)
			WHC-CM-4-3	Sections HWO-1, HWO-3, depending on hazards associated with test materials and/or wastes

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 11 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Preliminary and Detailed Design (Cont.)	CERCLA Process (40 CFR 300) (Cont.)	<ul style="list-style-type: none"> Conduct Post-Rod treatability studies (optional, for intermediate and complex ER projects) 	WHC-CM-1-6	Sections 3, 4, 5, depending on test location and radiation hazards associated with tests
			WHC-CM-4-11	Sections 6.0, 7.0; App's B, C, E, G, depending on test location and radiological and other hazards associated with testing activities
			WHC-CM-4-33	all sections, when testing activities are on site and radiological hazards are present in test materials or wastes
			WHC-CM-4-40	all relevant sections, depending on test location and associated safety hazards
			WHC-CM-4-41	Sections 3, 4, 5, 6, 7, depending on test location and associated fire hazards
	DOE 4700.1 Project Management Process	<ul style="list-style-type: none"> Prepare performance specifications (simple ER projects only) or Prepare Title I/II Design Documents (complex and intermediate ER projects only) 	WHC-CM-6-1	EP-1.2/EPG-1.2, EP-1.3/EPG-1.3, EP-1.11/EPG-1.11, EP-1.12/EPG-1.12, EP-2.4/EPG-2.4, EP-3.3/EPG-3.3, EP-4.1/EPG-4.1, App's C,D,E,F,G,H (optional), N,O,P,Q

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 12 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Preliminary and Detailed Design (Cont.)	DOE 4700.1 Project Management Process	• Prepare performance specifications (simple ER projects only) or Prepare Title I/II Design Documents (complex and intermediate ER projects only) (Cont.)	WHC-CM-6-12	P-10, P-20
			WHC-CM-6-2	PM-8, PM-9, PM-10, PM-11, PM-12, PM-13, PM-18 (if required)
			WHC-CM-4-9	all relevant sections, depending on radiological hazards associated with the RA
			WHC-CM-1-6	Sections 2, 3, 4, 5, depending on the radiation protection needs of the RA
			WHC-CM-4-11	Sections 6.0, 7.0; App's B, C, E, G, depending on the radiological and other safety hazards associated with the RA
			WHC-CM-4-46	all sections
			WHC-CM-8-9	all relevant sections, as applicable to electronic, electrical, and mechanical components or systems
		• Prepare long-lead procurement specifications (complex ER projects only)	WHC-CM-2-1	PP-7, PP-15.1
			WHC-CM-4-8	QAI 10.4

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 13 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Preliminary and Detailed Design (Cont.)	DOE 4700.1 Project Management Process (Cont.)	• Prepare long-lead procurement specifications (complex ER projects only)	WHC-CM-6-1	EP-1.2/EPG-1.2, EP-2.4/EPG-2.4, EP-3.3/EPG-3.3, App. I, J
			WHC-CM-6-2	PM-9, PM-10, PM-18 (if required)
		• Issue long-lead RFPs (complex ER projects only)	WHC-CM-2-1	PP-15.1, PP-15.2, PP-15.3, PP-15.4, PP-15.5, PP-19, PP-23.3, PP-25, PP-27, PP-28.3, PP-30, PP-45, PP-46, PP-47, PP-47.3, PP-49, PP-52
	DOE 5480.21, .22, .23 Safety/Risk Management Processes (Cont.)	• Prepare Final Operational Safety Analysis Report (complex and intermediate ER projects only)	WHC-CM-6-1	EP-1.11/EPG-1.1 or EP-1.2/EPG-1.12, App. F
			WHC-CM-6-2	PM-10, PM-18
			WHC-CM-4-3	Sections HWO-1, HWO-3; HWO-2 if RD incorporates development of RCRA TSD facility
			WHC-CM-1-6	Sections 2, 3, 4, 5, depending on the radiation protection needs associated with the RA
			WHC-CM-4-11	Sections 6.0, 7.0; App's B, C, E, G, depending on the radiological and safety hazards associated with the RA

Table 4. RD/RA Program Requirement and Implementing Document Matrix for Design-Related Activities. (sheet 14 of 14)

Project Phase	Regulatory Category Process ¹	Project Activity	Applicable Project Management Safety/Risk Management Manuals ²	Applicable Manual Sections or Procedures
Preliminary and Detailed Design (Cont.)	DOE 5480.21, .22, .23 Safety/Risk Management Processes (Cont.)	• Prepare Final Operational Safety Analysis Report (complex and intermediate ER projects only) (Cont.)	WHC-CM-4-40	all relevant sections, depending on the safety hazards associated with the RA
			WHC-CM-4-41	Sections 3, 4, 5, 6, 7, depending on the fire hazards associated with the RA
			WHC-CM-4-43	all applicable sections, depending on site location of RA
			WHC-CM-4-46	all sections
			[TBD? Safety Assessment/ Operational Safety Analysis Requirements for Intermediate/ Complex ER Projects]	

¹NEPA processes are not included; see Table 4.5.1

²Note: WHC-CM-1-3, -1-4, -2-5, -2-15, -4-1, and -4-2 apply categorically to all design activities, to the extent appropriate for each activity type. The change control practices of WHC-CM-6-1, EP-2.2/EPG-2.2 and the document identification, approval, and release practices contained in EP-1.1 and EP-1.7/EPG-1.7 apply to all engineering documents. WHC-CM-6-1 practices EP-1.2/EPG-1.2 and EP-1.3/EPG-1.3 apply, respectively to all activities resulting in the production of engineering specifications or drawings.

5.0 SUMMARY AND CONCLUSIONS

Preliminary benchmarking research of non-DOE RD/RA projects identified many reviews of the overall CERCLA Program, its management, and its financial status, while little or no information on the management of RD/RA activities was found. Review of DOE sites RD/RA activity revealed a strategy of compliance with CERCLA requirements and a graded approach utilization of DOE Order 4700.1 for development and management of the RD and construction process. This strategy is currently being applied to RD/RA activities at Fernald's Operable Unit 3. The Rocky Flats Plant ER program does not currently have projects in RD/RA phases, but they have developed a design guidance manual utilizing a compliance strategy similar to Fernald's.

The analysis of RD methodology concluded that a common program can be developed resulting in compliance with CERCLA and DOE project management orders. The functional equivalence of CERCLA and DOE 4700.1 design documents supports the approach of adherence to CERCLA requirements and collateral compliance with the intent of DOE Order 4700.1. The complexity of each RD project should be evaluated to determine the applicability of DOE project management and design orders.

The RCS presented for Hanford ER projects is based on a graded approach to DOE Orders by evaluation of project complexity. Three flow charts were developed to depict the requirements of simple, intermediate, and complex ER projects. Each flow chart presents the requirements of CERCLA, *Project Management* (DOE Order 4700.1), *Safety and Risk Management* (DOE Orders 5480.21, .22, and .23) and NEPA. Generic examples of simple, intermediate, and complex projects were provided on the flow charts. Finally, matrices were developed to show how existing WHC manuals and procedures will be used during RD/RA activities to comply with CERCLA and DOE Order 4700.1 requirements.

6.0 REFERENCES

- Ellingson, D.R. (WHC), K. Bohlander (EG&G Rocky), J.E. Hansen (WSRC), W.K. Crowley (MMES ORNL), and N.R. Kerr (WHC), 1994, *General Safety Basis Development Guidance for Environmental Restoration, Decontamination and Decommissioning*, WHC-EP-0726.
- EPA, 1989, *A Management Review of the Superfund Program*, U.S. Environmental Protection Agency, Washington D.C.
- EPA, July 1991, Federal Register, Vol. 56 No. 130, section; "Superfund Program; Model CERCLA RD/RA Consent Decree" U.S. Environmental Protection Agency, Washington, D.C.
- EPA-10, 1993, CERCLIS/WasteLAN, List-8: Site/Event Listing, U.S. Environmental Protection Agency, Region X, Seattle, Washington.
- GAO, 1993, *Superfund: Cleanups Nearing Completion, Future Challenges, and Possible Cleanup Approaches*, U.S. General Accounting Office, Washington, D.C.
- Hansen, J.E. (WSRC), N.R. Kerr (WHC), and L.H. Frauenholz (WINCO), 1994, *Westinghouse GOCO ER and D&D Safety Documentation Guidance*.
- OSWER, 1988, Directive 9355.3-01, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, U.S. Environmental Protection Agency, Washington, D.C.

7.0 BIBLIOGRAPHY

- ANSI/ASQC E4-19XX, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*; American Society for Quality Control, Milwaukee, WI.
- DOE, 1991, DOE Order 5700.6C, *Quality Assurance*, U.S. Department of Energy, Washington, D.C.
- DOE, 1992, DOE Order 4700.1, *Project Management System*; U.S. Department of Energy/ Office of Project and Facilities Management, Washington, D.C.
- DOE Order 5440.1D, *National Environmental Policy Act Compliance Program*; U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.21, *Unreviewed Safety Questions*; U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.22, *Technical Safety Requirements*; U.S. Department of Energy, Washington, D.C.
- DOE Order 5480.23, *Nuclear Safety Analysis Reports*; U.S. Department of Energy, Washington, D.C.
- DOE, 1992, DOE Order 6430.1A, *General Design Criteria*; U.S. Department of Energy, Washington, D.C.
- DOE 1994, RL-TPA-90-0001, *Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) Handbook*; U.S. Department of Energy, Richland Operations Office, Richland, Washington
- OTA, 1988, *Are We Cleaning Up? 10 Superfund Case Studies*; Congress of the United States/Office of Technology Assessment, Washington, D.C.
- WHC, *Management Policies*, WHC-CM-1-1, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Management Requirements and Procedures*, WHC-CM-1-3, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Corrective Action Management Manual*, WHC-CM-1-4, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Standard Operating Practices*, WHC-CM-1-5, Westinghouse Hanford Company, Richland, Washington.

- WHC, *WHC Radiological Control Manual*, WHC-CM-1-6, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Procurement Manual and Procedures*, WHC-CM-2-1, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Property Management Manual*, WHC-CM-2-3, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Management Control System*, WHC-CM-2-5, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Data Administration Standards*, WHC-CM-2-6, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Hazardous Material Packaging and Shipping*, WHC-CM-2-14, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Training Administration Manual*, WHC-CM-2-15, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Budget Formulation*, WHC-CM-2-17, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Information Release Administration*, WHC-CM-3-4, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Document Control and Record Management Manual*, WHC-CM-3-5, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Uniform Publications System*, WHC-CM-3-6, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Software Practices*, WHC-CM-3-10, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Emergency Plan*, WHC-CM-4-1, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Quality Assurance Manual*, WHC-CM-4-2, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Industrial Safety Manual*, WHC-CM-4-3, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Unclassified Computer Security*, WHC-CM-4-7, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Quality Assurance Instructions*, WHC-CM-4-8, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Radiological Design*, WHC-CM-4-9, Westinghouse Hanford Company, Richland, Washington.

- WHC, *ALARA Program Manual*, WHC-CM-4-11, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Operational Health Physics Practices Manual*, WHC-CM-4-12, Westinghouse Hanford Company, Richland, Washington.
- WHC, *QA Program Manual for ASME Code*, WHC-CM-4-28, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Nuclear Criticality Safety Manual*, WHC-CM-4-29, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Security Manual*, WHC-CM-4-33, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Nuclear Material Control and Accountability Manual*, WHC-CM-4-34, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Industrial Hygiene Manual*, WHC-CM-4-40, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Fire Protection Program Manual*, WHC-CM-4-41 Westinghouse Hanford Company, Richland, Washington.
- WHC, *Emergency Management Procedures*, WHC-CM-4-43, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Nonreactor Facility Safety Analysis Manual*, WHC-CM-4-46, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Sample Management and Administration*, WHC-CM-5-3, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Solid Waste Management*, WCH-CM-5-16, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Standard Engineering Practices*, WHC-CM-6-1 (Draft Release 59); Westinghouse Hanford Company, Richland, Washington.
- WHC, *Project Management*, WHC-CM-6-2, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Welding Manual*, WHC-CM-6-10, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Nuclear Criticality Alarm Manual for the 200 Areas*, WHC-CM-6-30, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Environmental Compliance*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.
- WHC, *Environmental Compliance Verification Program Manual*, WHC-CM-7-6, Westinghouse Hanford Company, Richland, Washington.

WHC, *Environmental Investigations and Site Characterization Manual*,
WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

WHC, *Operations Support Services*, WHC-CM-8-7, Westinghouse Hanford Company,
Richland, Washington.

WHC, *Job Control System*, WHC-CM-8-8, Westinghouse Hanford Company, Richland,
Washington.

WHC, *Workmanship Standards*, WHC-CM-8-9, Westinghouse Hanford Company,
Richland, Washington.

DATE

FILMED

9 / 1 / 94

END