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Richland Environmental Restoration Project Management Action Process Document

April 1996

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Department of Energy
Richland, Washington

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Richland ER Project Management Action Process Document

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EXECUTIVE SUMMARY

The *Richland ER Project Management Action Process (MAP) Document* (MAP document) is the prescribed means for providing direct input to the U.S. Department of Energy (DOE) Headquarters (HQ) regarding the status, accomplishments, strategy, and issues of the Richland Environmental Restoration (ER) Project. This document provides an accurate representation of the Richland ER Project mission, its organizational interfaces, and an operational history of the Hanford Site. Remediation strategies are analyzed in detail. The MAP document includes a status of Richland ER Project activities and accomplishments, and it presents current cost summaries, schedules, and technical baselines.

This document specifically addresses the unique environmental and regulatory conditions that exist at the Hanford Site, along with complex socioeconomic issues of local and regional origin. The Hanford Site consists of over 560 square miles, including four designated *National Priority List* (NPL) sites that contain over 1,600 waste sites. The Richland ER Project is responsible for the remediation of over 1,400 of these sites, which include 72 operable units (62 source and 10 groundwater). One groundwater plume contaminated with both radionuclide and hazardous constituents encompasses six miles beneath the Hanford Site. Part of the contamination associated with this plume has reached the Columbia River.

The MAP document identifies the current Hanford Site environmental restoration strategy. This strategy balances diverse stakeholder values, regulatory requirements, human and environmental risks, rights of workers, limited budgets, and funding constraints. A key component in the development of the Hanford Site ER Strategy has been stakeholder input. The political and regulatory framework of the Hanford Site is complex, with diverse views represented by DOE, the U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), tribal entities, public comments, and the National Resource Trustee Council (NRTC). In 1989, DOE agreed to a regulatory framework with EPA and Ecology, as documented in the *Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)*. Under the *Tri-Party Agreement*, DOE is subject to stipulated penalties for non-compliance.

The Richland ER Project has achieved one of its major goals by streamlining the ER program so that field work is being completed in the most cost-effective and expedient manner. Estimated costs for remedial action within the Richland ER Project have been reduced by \$2 billion in current dollars. Notable causes of these reductions include lower volumes of soil to be excavated in the 100 and 300 Areas; deletion of the requirement for a vertical barrier planned for the 100-N Area; less costly designs for caps and barriers; and earlier-than-expected operation of the Environmental Restoration Disposal Facility. These cost reductions result from improvements in the planning and conduct of remedial actions. Another important cost-savings innovation implemented at the Hanford Site is the *bias-for-action* approach, which utilizes an observational approach to site characterization, thereby allowing for flexibility in the remedial process (based on results of actual, in-progress remediation activities). The net result is the ability to complete field remediation in a more expedient and cost-effective manner than is the standard in using a traditional remedial process under the *Comprehensive Environmental Recovery, Liability, and Compensation Act of 1980* (CERCLA).

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LIST OF ACRONYMS

NOTE: In the MAP document acronyms are used according to the following policy. If an acronym is used for a technical item, the technical item will be spelled out fully the first time it is used, followed by the acronym (in parentheses). The acronym will then be used in all instances after its first callout. For example, once the acronym for CERCLA is used in Section 1.0, it will always be used throughout the MAP document.

AAMS	Aggregate Area Management Studies
ADS	Activity Data Sheet
ALE	Arid Lands Ecology
AME	Assistant Manager for Environmental Restoration
ARARs	Applicable, Relevant, and Appropriate Requirements
AWQC	Ambient Water Quality Criteria
BCP	Baseline Change Proposal
BEMR	<i>Baseline Environmental Management Report</i>
BHI	Bechtel Hanford, Inc.
BQIT	Business Quality Improvement Team
CERCLA	<i>Comprehensive Environmental Recovery, Liability and Compensation Act of 1980</i>
CLUP	<i>Comprehensive Land Use Plan</i>
CP	Conceptual Plan
CRBG	Columbia River Basalt Group
CRCIA	Columbia River Comprehensive Impact Assessment
D&D	Decontamination and Decommissioning
DNFSB	Defense Nuclear Facility Safety Board
DOE	U.S. Department of Energy
DOH	Washington State Department of Health
DQO	Data Quality Objective
DWS	Drinking Water Standards
EAL	Environmental Analytical Laboratory
EAP	Environmental Assurance, Permits, Policy
Ecology	Washington State Department of Ecology
EDMS	Electronic Document Management System
EE	Engineering Evaluation
EE/CP	Engineering Evaluation/Conceptual Plan
EIS	Environmental Impact Statement
EM	Environmental Management
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ERA	Expedited Response Action
ERC	Environmental Restoration Contractor
ERDF	Environmental Restoration Disposal Facility
ERWM	Environmental Restoration and Waste Management
FFS	Focused Feasibility Study
FFTF	Fast Flux Test Facility
FMEF	Fuels and Materials Examination Facility
FSUWG	Future Site Uses Working Group

LIST OF ACRONYMS

GAC	Granulated Activated Carbon
GW	Groundwater
HAB	Hanford Advisory Board
HAPC	Hanford Amplified Prioritization Criteria
HCRL	Hanford Cultural Resources Laboratory
HEIS	Hanford Environmental Information System
HGIS	Hanford Geographic Information System
HPPS	Hanford Past Practice Strategy
HQ	U.S. Department of Energy Headquarters
HRA-EIS	<i>Hanford Remedial Action Environmental Impact Statement</i>
HRD	Human Resources Division
HSRAM	Hanford Site Risk Assessment Methodology
IRM	Interim Remedial Measure
IROD	Interim Record of Decision
LFI	Limited Field Investigation
LRP	Long Range Plan
MAP	Management Action Process
M&O	Management & Operations
MSIN	Mail Stop ID. Number
NCP	<i>National Contingency Plan</i>
NEPA	<i>National Environmental Policy Act</i>
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NHPA	<i>National Historic Preservation Act</i>
NPDES	<i>National Pollution Discharge Elimination System</i> (Clean Water Act)
NPL	<i>National Priority List</i>
NRDA	National Resource Damage Assessment
NRTC	National Resource Trustee Council
OBP	Optimized Baseline Project
OU	Operable Unit
PE	Performance Evaluation
PF	Pathway Factor
PM&S	Program Management & Support
PNNL	Pacific Northwest National Laboratory
POC	Performance Objective Criteria
PP	Proposed Plan
PRP	Potentially Responsible Party
PRTR	Plutonium Recycle Test Reactor
PUREX	Plutonium-Uranium Extraction Facility
QA	Quality Assurance
QIT	Quality Improvement Team
QRA	Qualitative Risk Assessment
R&D	Research and Development
Rad Equip	Radioactively Contaminated Equipment
RA	Remedial Action Project
RARA	Radiation Area Remedial Action
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>

LIST OF ACRONYMS

RDS	Risk Data Sheet
REDOX	Reduction Oxidation Plant
RF	Receptor Factor
RI	Remedial Investigation
RL	U.S. Department of Energy, Richland Operations Office
RMT	Results Management Team
ROD	Record of Decision
RRE	Relative Ranking Evaluation
S&M	Surveillance and Maintenance
SHF	Source Hazard Factor
SNM	Special Nuclear Materials
SST	Single-Shell Tanks
STCG	Hanford Site Technology Coordination Group
TDD	Technology Development Division
<i>Tri-Party Agreement</i>	<i>Hanford Federal Facility Agreement and Consent Order</i>
TSD	Treatment, Storage, and Disposal
TWTF	Tank Waste Task Force
UO	Uranium Oxide
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank
WBS	Work Breakdown Structure
WHC	Westinghouse Hanford Company
WIDS	Waste Information Data System

1.0 INTRODUCTION

This introduction identifies the purpose of the MAP, the organization of the MAP document, and the objectives, mission, vision, goals and priorities of the Richland ER Project. Project team members are identified, as are inter-relationships between the Richland ER Project and other DOE organizations. Interfaces with external entities (e.g., regulators, stakeholders, and trustees) are identified. The introduction also describes the Richland ER Project approach for conducting the MAP, and strategies for future MAP implementation.

A critical mission of the U.S. Department of Energy (DOE) is the planning, implementation, and completion of environmental restoration programs at DOE facilities. An integral part of this mission involves the safe and cost-effective environmental restoration of the Hanford Site.

For over 40 years the Hanford Site supported United States national defense programs, largely through the production of nuclear materials. One legacy of historical Hanford Site operations is a significant waste inventory of radioactive and/or regulated chemical materials. Releases of these materials have, in some cases, contaminated the Hanford Site environment. The DOE Richland Operations Office (RL) is responsible for protecting human health and the environment from potential Hanford Site environmental hazards by identifying, assessing, and mitigating risks posed by contaminated sites.

The Hanford Site covers 1,450 km² (560 mi²) along the Columbia River in southcentral Washington State (Figure 1-1). The Hanford Site contains over 1,600 contaminated waste sites, and approximately 670 of these are within a half mile of the Columbia River. These waste sites also include 145 contaminated, deteriorating, inactive and surplus facilities. The Richland Environmental Restoration (ER) Project is responsible for the remediation of over 1,400 of these sites, which include 72 operable units (62 source and 10 groundwater). Over 625,000 m³ (817,000 yds³) of solid waste, containing an estimated 4.8 million curies of radioactive materials, were previously buried in Hanford Site soils. Over 1.7 trillion liters (450 billion gallons) of liquid waste containing radioactive and chemical contamination have been discharged to the ground at the Hanford Site. Early disposal practices resulted in the contamination above federal drinking water standards (DWS) of 220 km² (85 mi²) of groundwater beneath the Hanford Site. Groundwater contaminants include hazardous, chemical, and/or radioactive wastes. Contaminated groundwater plumes of environmental concern are entering the Columbia River.

The Columbia River system is the second largest river system in North America, and the river is a vital economic resource to the Pacific Northwest. The Columbia River is classified by the State of Washington as Class A, Excellent, and is used as a source of drinking water for numerous cities and towns. The Columbia River also supports transportation, production of

1.0 INTRODUCTION

Figure 1-1. Hanford Site Map.

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hydroelectric power, and extensive agricultural irrigation and recreation. The river is a focal point for tribal entity cultural, religious, and food gathering activities.

RL established the Richland ER Project in 1987 to plan, execute, and control the management and disposition of the Hanford Site's past-practice environmental contamination. The Hanford Site political and regulatory framework is complex, with diverse and divergent views represented by DOE, the U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology), tribal entities, other stakeholders, and trustees. In 1989, DOE agreed to a regulatory framework with EPA and Ecology, as documented in the *Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)*. Enforceable under the *Comprehensive Environmental Recovery, Liability and Compensation Act of 1980 (CERCLA)*, the *Tri-Party Agreement* specifies actions that RL has agreed to perform (along with associated milestones and schedule) to clean up the Hanford Site. A key component of the *Tri-Party Agreement* has been public participation by stakeholders, trustees, and the four tribal entities. Effective implementation of the Richland ER Project requires integration of many existing plans and activities. It also requires the initiation of diverse new plans to ensure optimal achievement of Hanford Site restoration.

1.1 PURPOSE OF MANAGEMENT ACTION PROCESS

In 1995, the DOE Office of the Deputy Assistant Secretary for ER (EM-40) identified the need to implement a MAP for environmental restoration activities at nation-wide DOE sites. The purpose of this MAP document is to provide an integrated and consolidated source of information on the status, strategies, schedules, costs, and key issues for the Richland ER Project. DOE Headquarters (HQ) views each MAP document as a key information resource in the presentation of input to the national Environmental Management (EM) budget decision-making processes, and for the Approval of Baseline Critical Decision for environmental restoration projects. The MAP document provides HQ and site stakeholders with a credible representation of the Richland ER Project. It identifies the project team, the operational history of the Hanford Site, its environmental setting, hazards and relative risks for each release site, current activities, and project strategies. The MAP document includes a summary of cost, schedule, and technical baselines, and it provides a consolidated reference to information on past, present, and future activities at the Richland ER Project.

The MAP provides a definitive means to achieve effective communications, and it facilitates decision-making and integration of actions to ensure the safe, timely, and cost-effective performance of Richland ER Project activities at the Hanford Site. The MAP provides a means for developing a common understanding of project status and strategy, and for evaluating changing project requirements. The MAP also provides guidelines for identification of project improvements and opportunities, setting priorities, sequencing work activities, and identifying

1.0 INTRODUCTION

and resolving strategic issues. The MAP provides a dynamic approach to developing effective ER strategies and resolving environmental, technical, operational, and administrative issues so that environmental actions can be effectively and expeditiously completed.

The Richland ER Project is using the MAP document as a definitive means for providing direct input to HQ on Richland ER Project accomplishments, status, strategy, and issues. The MAP document provides a quick reference to project information at a summary level. Since the dynamic nature of the MAP results in a "living" document, periodic updating will be required.

The primary objectives and goals of the MAP document include the following:

- Identifying relationships of the Richland ER Project with regulators and other interested parties.
- Defining the roles and responsibilities of organizations involved with the Richland ER Project.
- Developing a common understanding of project status and strategy.
- Identifying project improvement opportunities.
- Establishing priorities and sequences of work activities.
- Establishing a means by which funding can be prioritized for ER projects.
- Defining the major actions required to accomplish the ER mission.

1.2 ORGANIZATION OF MAP DOCUMENT

This document is organized according to the guidance contained in the DOE ER Program *Management Action Process Workshop Notebook* and the DOE EM-40 *Management Action Process Resource Guide*.

1.0 - Introduction. This section identifies the purpose of the MAP, the organization of the MAP document, and the objectives, mission, vision, goals, and priorities of the Richland ER Project. Project team members are identified, as are interrelationships between the Richland ER Project and other EM and DOE organizations. Interfaces with external entities (e.g., regulators, tribal entities, stakeholders and trustees) are identified. The introduction also describes the Richland ER Project approach for conducting the MAP, and strategies for future MAP implementation.

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2.0 - Installation Description and Comprehensive Planning. This section describes past operations that resulted in contaminant releases at the Hanford Site. It describes the Hanford Site's environmental setting, including location, ecosystems, geography, geology, onsite and offsite land uses. Community and regional social, economic, natural, and cultural factors that influence the Richland ER Project strategy are summarized. This section also describes Hanford Site facilities, equipment, and infrastructure. Future options for the use of land, facilities, equipment, and infrastructure are identified, and plans for waste disposal are summarized.

3.0 - Status of Environmental Restoration Activities. This section summarizes Hanford Site environmental restoration activities, environmental priority conditions, and concentrations of principal contaminants. This section addresses regulatory agreements, consent decrees, compliance and other legal drivers. It also summarizes current waste management and material disposition activities, as well as non-regulatory activities.

4.0 - Site Relative Risk. This section summarizes relative risks to workers, the public, and environmental ecosystems. It also describes how the Richland ER Project prioritized work to systematically reduce these risks.

5.0 - Environmental Restoration Strategy. This section describes the Richland ER Project strategy and key assumptions. It describes the Richland ER Project management strategy, including regulatory and non-regulatory activities. This section also describes Richland ER Project performance measures.

6.0 - Environmental Restoration Project Master Schedule. This section presents the Richland ER Project Master Schedule, and displays activities that are planned or anticipated throughout the duration of the ER program. This section also contains a table of compliance milestones.

7.0 - Issues and Initiatives. This section summarizes key issues affecting the Richland ER Project, including project impacts, major parties involved in resolution, actions planned for resolution, and schedules. It describes initiatives that are being implemented to improve the Richland ER Project.

Appendix A - ER Cost Baseline. This Appendix presents the installation cost baseline table.

Appendix B - Major Installation Environmental Restoration Documents. This Appendix summarizes major Richland ER Project documents.

Appendix C - Decision Documents/Record of Decision Summaries. This Appendix presents brief summaries of key decision documents and Records of Decision (RODs).

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Appendix D - Conceptual Model Data Summaries. This Appendix presents the conceptual site model, including data-derived maps, figures, tables, and narrative.

Appendix E - Project Controls. This Appendix contains a description of the project controls system for the Richland ER Project.

Appendix F - Sources Cited in the MAP Document. This Appendix identifies the documents that are referenced in specific sections of the MAP document.

1.3 ENVIRONMENTAL RESTORATION PROJECT OBJECTIVES

The Richland ER Project vision, mission, goals, objectives, and priorities (presented below) will achieve the desired end point for Hanford Site environmental restoration.

1.3.1 Vision

The vision of the Richland ER Project is that the Hanford Site has been progressively restored, preserved, or protected in a manner that has made land available for other beneficial uses. The required cleanup standards have been achieved and stakeholder values have been expressed and met. The required work has been performed using state-of-the-art science and technology in a manner that was lifecycle cost-effective, while protecting the safety and health of workers, the public, and the environment.

To achieve this vision, the Richland ER Project will perform integrated and phased work activities based on established priorities to progressively restore the Hanford Site to a condition that allows other uses, while maintaining a commitment to an injury-free workplace and minimizing environmental damage that could result from the remediation process. The Richland ER Project will perform cleanup activities on a technically sound and cost effective manner. The Richland ER Project will protect the health and safety of workers and the public, and will prevent further degradation of the environment.

1.3.2 Mission

The mission of the Richland ER Project is to perform clean-up activities to preserve, protect, or restore the Hanford Site to allow other beneficial uses.

In support of this mission, the project will strive to accomplish the following:

- Protect the safety and health of workers and the public.

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- Minimize harmful effects to the environment.
- Control hazardous materials in a safe condition.
- Balance the use of aggressive restoration activities, natural environmental processes, and associated risk in the decision-making process while considering stakeholder values, current and future land use options, and lifecycle cost effectiveness.
- Focus research and development on the needs of the project, and use cost-effective, state-of-the-art, innovative science, engineering, and technology.
- Manage natural resources until the land is available for other beneficial uses.

1.3.3 Strategic Goals and Objectives

The following strategic goals and objectives (which are not presented in any order of priority) define the major actions required to accomplish the Richland ER Project mission and achieve the desired environmental restoration of the Hanford Site. However, these strategic, long-term goals and objectives may not be in full accordance with the shorter-term milestones mandated by the *Tri-Party Agreement* (as currently drafted). The strategic goals and objectives were developed through the application of DOE's strategic planning process.

Protect the Columbia River - Contamination entering the Columbia River will not exceed an allowable exposure limit for any receptor at the point of exposure along the entire Hanford Reach segment of the Columbia River. The groundwater plumes of greatest environmental concern include the chromium and radioactive strontium plumes entering the river in the 100 Areas.

Contain 200 Area Groundwater Plumes - The 200 Area groundwater contamination plumes (e.g., carbon tetrachloride, uranium, technicium) may require selective interception or containment in order to protect the Columbia River. It is assumed that use of groundwater beneath the 200 Areas will be restricted until natural processes, including radioactive decay, lower the concentrations to acceptable limits.

Remediate the 100 Area Waste Sites - Remaining waste sites within the 100 Area *National Priorities List* (NPL) will be remediated to standards that will make the land available for unrestricted use.

Remediate the 100 Area Facilities - All 100 Area facilities, except facilities used for waste management, will be secured in a safe storage condition (or removed) to reduce risk to workers and the public so as to facilitate soil and groundwater cleanup and to increase the area available

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for safe public access. Safe storage is defined as a condition that will 1) present minimal risk to the public from inadvertent intrusion; and 2) address risk reduction for future worker safety and environmental protection. This ensures that facilities are in a condition such that workers' risks (associated with future remediation) will not increase with time. It is assumed that minimal intrusion to perform surveillance and maintenance (S&M) will then be required to maintain the 100 Area facilities in a safe condition.

Restore the 300 Area - The 300 Area waste sites and facilities are expected to be dispositioned to allow industrial use. It is assumed that soil remediation standards will be based on industrial use.

Consolidate Wastes in the 200 Areas/Central Plateau - Waste sites will be placed in a safe condition that reduces the risk to workers and the public. A safe condition is defined as a condition (resulting from consolidation, confinement, stabilization, or isolation) that presents no increased risk to the public from inadvertent intrusion, while protecting the environment and maintaining facilities in a condition such that risks to workers associated with continued S&M and future decontamination and decommissioning (D&D) are minimized. It is assumed that this area will be used for long-term waste disposal for wastes generated by Hanford Site environmental restoration activities.

1.3.4 Priorities

The priorities for the development of the Richland ER Project workscope elements use the Hanford Amplified Prioritization Criteria (HAPC) listed below. These criteria are consistent with HQ (EM-40) program priorities and objectives. The criteria are supplemented by information in the risk data sheets (RDSs), and are used to develop an integrated priority list that considers legal requirements, the views of regulators, tribal entities, trustees, and stakeholders, along with management judgment. As work scope elements are prioritized, the risk evaluations of the RDSs must be considered to ensure high priority work is also resulting in appropriate levels of risk reduction at the Hanford Site.

The Hanford Amplified Prioritization Criteria are as follows:

1. *Minimum Base Safe Operations*: Minimum-safe operations are those surveillance, maintenance, and support activities required to control existing materials, wastes, and facilities in a safe, stable manner. No remediation, stabilization, or disposal activities are included. Minimum-safe operations shall include a proportional share of program management, quality control, and training necessary for proper conduct of operations. Minimum-safe operations are focused on public safety and health, personnel safety and health, and environmental protection.

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2. *Mitigate Urgent Risks:* These criteria apply to those operations that are intended, designed, and carried out with the specific purpose of reducing the level of public, worker and environmental risk. The mitigation of urgent risks include the specific actions that reduce risks from a very high consequence (or likelihood of occurrence) to a medium or low likelihood of occurrence.
3. *Reduce/Eliminate Costly Mortgages:* When expensive safety, surveillance, security and/or maintenance costs are eliminated (or reduced) by stabilizing, closing, or deactivating facilities, mortgage costs are reduced. Reducing mortgage costs frees up resources that can be applied more specifically to cleanup activities.
4. *Stabilize/Contain Wastes:* The Hanford Site waste legacy includes significant quantities of unstable and marginally contained waste. The first step in a risk based strategy must be to stabilize and contain all waste. Waste with the potential for significant risk reduction through stabilization or containment will have priority over waste that presents lower risks.
5. *Remediation Along and Protection of the Columbia River:* The Columbia River flows through the Hanford Site and provides a potential pathway for the spread of contamination beyond site boundaries. In addition, the river itself has value and importance to regional stakeholders. It therefore requires protection. Activities specifically designed to protect the river and to remediate contamination along the river are vital in accomplishing the cleanup mission, as well as supporting important social, economic, and cultural objectives.
6. *Focus Groundwater Remediation to Payoff Areas:* Past practices and accidental leaks of liquid contaminants are responsible for the existence of subsurface contamination and contaminated groundwater plumes. The Hanford Site groundwater strategy focuses on reducing the migration potential of 200 Area plateau contaminants to within the Future Site Users Working Group (FSUWG) boundary. Tritium and nitrate plumes will be allowed to migrate under ambient conditions. Near-term actions in the 100 Area will focus on protection of the Columbia River.
7. *Maintain Adequate Site Support/Infrastructure Functions:* Many site-wide activities are essential to ensure public and worker safety, as well as health and environmental protection. Those functions that cannot be assigned to a specific program, but are nonetheless essential to Hanford Site accomplishments, comprise this priority.

1.4 MANAGEMENT ACTION PROCESS PROJECT TEAM

Tables 1-1 and 1-2, respectively, identify core and technical project team members. Because many personnel are involved with the project, only key points of contact (i.e., lead positions) are listed. DOE, contractor, regulatory personnel, representatives of tribal entities, and stakeholders are identified in the tables.

1.0 INTRODUCTION**Table 1-1. Core Project Team Members.**

Name	Title	Organization	Role/Responsibility	Phone	MSIN
D. MacKenzie	Dir. Richland Operations Division	DOE-HQ/ EM-442	DOE-HQ Programmatic Direction	(301) 903-7426	N/A
L. K. McClain	Assistant Manager ER	RL/AME	Manage and direct ER Project	(509) 376-6628	H0-12
R. D. Freeberg	Dir. Restoration Projects Support	RL/AME/RP	Restoration Projects Support Direction	(509) 376-7167	H0-12
R. A. Holten	Dir. Restoration Projects	RL/RP	Restoration Projects Direction	(509) 376-7277	H0-12
S. M. Sandlin	Business Manager	RL/AME	Business Initiatives and Performance Fee Coordinator	(509) 376-6835	H0-12
S. A. Sieracki	Contracting Officer	RL/PRO	Procurement Services	(509) 376-2955	H0-12
G. L. Amidan	Contract Specialist	RL/CFR	Contract Finance Review	(509) 376-7737	A7-72
J. F. Nemec	President	BHI	President, ERC Team	(509) 375-4646	H0-09
S. D. Liedle	V.P. Operations	BHI	V.P. Operations, ERC Team	(509) 375-4648	H0-09
M. C. Hughes	Manager of Projects	BHI	Management of Projects for ERC	(509) 372-9644	H0-09
R. H. Wyer	Assessmts/Env Compliance Manager	BHI	Assessmts/Env Compliance Management	(509) 375-4666	H0-09
J. G. Zoghbi	Manager, Program Mgmt/Support	BHI	Program Mgmt/Support Management	(509) 372-9526	H0-09
S. C. Foelber	Eng'g & Technology Manager	BHI	Eng'g & Technology Management	(509) 375-4663	H0-09
T. E. Logan	Field Support Manager	BHI	Field Support Management	(509) 372-9541	H0-09
J. E. Tarpinian	Quality, Safety & Health Manager	BHI	Quality, Safety & Health Management	(509) 375-4667	H0-09
M. B. Fox	Manager Planning/Controls	BHI	Planning/Controls Management	(509) 372-9060	H0-09
D. Sherwood	Program Manager	US EPA	Regulatory Oversight	(509) 376-9529	B5-01
M. Wilson	Program Manager	Ecology	Regulatory Oversight	(360) 407-7150	B5-18
S. Alexander	Program Manager	Ecology	Regulatory Oversight	(509) 736-3045	B5-18
A. Conklin	Program Manager	DOH	Regulatory Oversight	(360) 586-0254	N/A
R. Patt	HAB/ER Subcommittee	HAB/ER	Public Stakeholder Input	(509) 378-8455	N/A
D. Powauke	Nez Perce Tribe ER Contact	Nez Perce Tribe	Tribal Input	(208) 843-7375	N/A
J. R. Wilkinson	Confederated Tribes of the Umatilla ER Contact	Umatilla Tribes	Tribal Input	(541) 276-0105	N/A
R. Jim	Yakama Nations Council ER Contact	Yakama Tribes	Tribal Input	(509) 452-2502	N/A
Rex Buck, Jr.	Wanapum People Contact	Wanapum People	Tribal Input	(509) 754-3541	N/A
P. Gubanc	DNFSB Richland Contact	DNFSB	Nuclear Safety Oversight	(509) 373-3838	N/A
D. Ogg	DNFSB Richland Contact	DNFSB	Nuclear Safety Oversight	(509) 373-0101	N/A

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Table 1-2. Technical Team Members.

Name	Title	Organization	Role/Responsibility	Phone	MSIN
C. H. Gunion	ER Facility Representative	RL/AME	Oversee Compliance Procedures	(509) 376-7193	H0-12
M. S. Peck	ER Facility Representative	RL/AME	Oversee Compliance Procedures	(509) 373-3157	H0-12
J. E. Cavanaugh	Health & Safety Team Lead	RL/AME/ RPS	Oversight of ER Health & Safety Program	(509) 373-9625	H0-12
J. F. Schlatter	Manager Community Relations	BHI	Community Relations Management	(509) 375-4673	H0-09
N. N. Haag	Manager Human Resources	BHI	Human Resources Management	(509) 375-4671	H0-09
M. P. Hearney	Managing Counsel	BHI	Counsel Managing	(509) 372-9196	H0-13
L. O. Martinez	QA Manager	BHI	QA Management	(509) 375-4681	H0-09
D. E. Gergely	RADCON Manager	BHI	RADCON Management	(509) 376-3770	X0-34
R. D. Lichfield	Safety and Hygiene Manager	BHI	Safety and Hygiene Management	(509) 372-9254	H0-15
W. L. Pamplin, Jr.	Env. Technology Manager	BHI	Env. Technology Management	(509) 372-9393	H0-18
D. W. Belangia	Automation Technology Manager	BHI	Automation Technology Management	(509) 375-4668	H0-03
A. A. Freitag	PE Manager	BHI	PE Management	(509) 375-9687	H0-18
J. W. Darby	PE Manager	BHI	PE Management	(509) 372-9096	H0-18
D. D. Teel	Technical Manager	BHI	Natural Res & Risk Assmt Management	(509) 372-9633	H0-02
K. R. Fecht	Technical Manager	BHI	Env. Site Investigations Management	(509) 372-9356	H0-02
W. H. Price	Technical Manager	BHI	Sample & Data Mgmt Management	(509) 372-9401	H0-18
R. J. Landon	Technical Manager	BHI	Regulator Support Management	(509) 372-9209	H0-18
J. H. Dunkirk	Environmental Counsel	BHI	Environmental Counsel	(509) 372-9205	H0-09

1.5 ORGANIZATIONAL INTERFACES

Figures 1-2, 1-3, and 1-4 depict ER Project organization charts, showing paths of reporting and direction between and within HQ, RL, and the ERC team. Organizational functions are presented in Table 1-3. These figures and tables are presented at the end of this section.

1.6 STATUS OF THE MAP

1.6.1 Current Process

The overall environmental project management strategy has evolved significantly since the 1987 inception of the Richland ER Project. As planning and execution of ER activities became increasingly complex, project integration efforts became necessarily more comprehensive. Relationships between the various responsible and interested parties required clarification and formalization, and documents were needed to record and support the project integration process,

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including periodic updates to reflect changing conditions and priorities. This process will continue with the inception of the MAP.

The fundamental basis of the Richland ER Project consists of the following elements:

- Focus on the project vision, mission, objectives, and priorities.
- Communication between responsible and interested parties.
- Comprehensive planning for project implementation and future land use.
- Awareness of regulatory drivers.
- Risk assessment and risk management.
- Adoption of ER and management strategies based on sound, realistic assumptions.
- Maintenance of comprehensive and effective project controls systems.
- Awareness of issues that may affect project performance.
- Formulation of initiatives to improve the project.

Effective implementation of these elements will continue to require frequent decisions regarding the ER project.

1.6.2 MAP Process Strategy

The Richland ER Project has established a framework for regulator, stakeholder, and tribal entities participation that is similar to the MAP. The basic elements of this framework include the *Tri-Party Agreement*, Hanford Advisory Board (HAB) meetings, and "nation-to-nation" meetings between DOE and the four tribal entities. This framework supports constant efforts to improve meeting the needs of regulators, tribal entities, trustees, and stakeholders.

Integration of the following four key elements, together with overall community relations activities, provide for the significant strategic involvement of interested and concerned parties in decisions affecting the Richland ER Project.

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Tri-Party Agreement

The *Tri-Party Agreement* is a legally enforceable agreement signed by the EPA, the Ecology, and DOE. The *Tri-Party Agreement* process includes the following activities:

- Enforceable milestones subject to stipulated penalties and citizen suit enforcement rights.
- Monthly meetings with regulators and DOE senior management to discuss project status and current issues.
- Daily interfaces between DOE and regulator project managers.
- Special topic meetings addressing data quality objectives, remedial strategy development, and review of the *ER Long Range Plan*.
- Regulator participation in the planning, prioritization, and review of budget request documentation.

Hanford Advisory Board

The HAB consists of 32 members representing special interest groups, local governments, state governments, employees, and regulators. The HAB process includes regularly scheduled meetings of the following HAB subsets:

- The main board, to discuss project status and issues.
- The Dollars and Sense Subcommittee, to discuss planning and budget request activities.
- The ER Subcommittee, to discuss ER-specific issues.
- An ad hoc group, to ensure participation of the HAB in Hanford Site strategic planning.
- Safety.

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Tribal Entities

The tribal entities have requested "nation-to-nation" interfaces with DOE to discuss tribal entity issues. Additionally, tribal entity involvement includes ongoing participation in the following activities:

- The Columbia River Comprehensive Impact Assessment (CRCIA) Committee.
- The Natural Resources Trustees Council.
- The Consistency Review Committee for the RDSs.
- DOE planning and budget request meetings.
- Hanford Cultural Resources Management Program.

The four tribal entities include the Confederated Tribes of the Umatilla, the Yakama Nation, the Nez Perce tribe, and the Wanapum People.

Natural Resource Trustee Council (NRTC)

The NRTC consist of representatives from the Yakama Indian Nation; the Confederated Tribes of the Umatilla; the Nez Perce Tribe; the state of Washington (represented by Ecology and the Washington Department of Fish and Wildlife); the state of Oregon (represented by the Oregon Department of Energy); the U.S. Department of Interior (represented by the U.S. Fish and Wildlife Service and the Bureau of Land Management); and the U.S. Department of Commerce (represented by the National Oceanic and Atmospheric Administration).

RL meets monthly with the natural resource trustees concerning the cleanup of a CERCLA release. The objectives of these meetings include ensuring that natural resource values are fully integrated with Hanford Site decision-making processes, encouraging the development of site-wide natural resource management planning, and establishing good stewardship principles.

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Figure 1-2. DOE HQ and RL/AME Project Organization.

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Figure 1-3. RL/AME Project Organization.

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Figure 1-4. Environmental Restoration Contractor Team Organization.

1.0 INTRODUCTION**Table 1-3. Organizational Functions.**

Name of Organization	Role/Responsibility
HQ Office of Assistant Secretary for ER & WM (EM-1)	General management, policy guidance on EM Program
HQ Office of Deputy Assistant Secretary for ER (EM-40)	ER Project activities, including funding priorities and policy guidance
HQ Office of Northwest Area Programs (EM-44)	Programmatic direction, overview, project assistance, HQ coordination
Richland Operations Office (RL)	Management of overall Richland Operations
Richland Operations Office (RL) Office of Assistant Manager for Environmental Restoration (AME)	Manage and direct the Richland ER Project
RL/AME Restoration Projects Division	Day-to-day management, technical direction, and contractor oversight
RL/AME Restoration Projects Support Division	Overall ER planning, management and financial systems, and technical support
RL/AME Business Management and Special Projects	Contractor management, implementing changes in business methods, business management
Other RL organizations	Various ER support/interface roles; matrix staff
Bechtel Hanford, Inc. (BHI)	Primary contractual responsibility for implementing ER and remediation activities
Other contractors	Execution of activities negotiated and agreed upon by RL or BHI
U. S. Environmental Protection Agency (EPA)	Regulatory oversight of ER activities in accordance with <i>Tri-Party Agreement</i> and related documents
Washington State Department of Ecology (Ecology)	Regulatory oversight of ER activities in accordance with <i>Tri-Party Agreement</i> and related documents
Washington State Department of Health (DOH)	Regulatory oversight of ER activities relative to health
HQ and RL Office of Waste Management (EM-30)	Disposal of ER-generated hazardous waste, certain single-shell tank (SST)-related activities
HQ and RL Office of Facility Transition (EM-60)	Transfer of facilities from EM-60 to EM-40 for D&D
HQ and RL Office of Technology Development (EM-50)	Technical demonstrations
Pacific Northwest National Laboratory (PNNL)	Technology, research, and development
Tribal entities (Nez Perce, Umatilla, Yakama, Wanapum)	Tribal entities input
Hanford Advisory Board (HAB)	Stakeholder interface/input
Defense Nuclear Facilities Safety Board (DNFSB)	Nuclear Safety oversight

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

This section describes past Hanford Site operations, including environmental setting and community, regional, social, economic, natural, and cultural factors. Future options for Hanford Site land, facilities, equipment, and infrastructure are discussed, as are plans for waste disposal activities.

2.1 OPERATIONAL HISTORY OF THE HANFORD SITE

In 1943, under the auspices of the Manhattan Project, the U.S. Army Corps of Engineers selected the Hanford Site as the location for nuclear reactor and spent fuel processing facilities (Figure 2-1). The Hanford Site mission was to produce plutonium for nuclear weapons. This required a large military-industrial complex that included nuclear reactors (to produce plutonium), chemical processing (to separate and purify plutonium), waste management practices (to store and dispose of nuclear waste), and research (to support the overall Hanford Site mission). Table 2-1 summarizes the operational history of the primary facilities that supported the Hanford Site defense mission.

Beginning operations in 1944, nine production reactors located in the 100 Areas of the Hanford Site produced irradiated uranium for chemical processing operations. These reactors irradiated approximately 100,000 metric tons of uranium fuel. Eight of the reactors were graphite-moderated and used Columbia River water for once-through cooling. These reactors were shut down by 1971. The ninth reactor, a dual-purpose reactor (Nreactor), used recirculating water coolant and produced both plutonium and steam for electricity. N-Reactor operated until 1987, and is now undergoing deactivation.

Two test reactors were also constructed and operated at the Hanford Site. The Plutonium Recycle Test Reactor (PRTR), a heavy-water moderated test reactor located in the 300 Area, was used in the Plutonium Fuels Utilization Program. The PRTR is retired and has been deactivated. The Fast Flux Test Facility (FFTF), a sodium-cooled reactor located in the 400 Area, was used to test fuels and materials for advanced nuclear power plants. In 1993, the FFTF began transitioning to permanent shutdown. One commercial nuclear power plant, operated by the Washington Public Power Supply System, is located on the Hanford Site. It has an operating output of 1,100 megawatts.

Chemical processing operations during defense production generated high-level radioactive liquid wastes. About 245 million liters (65 million gallons) of high-level waste are stored at the Hanford Site in 177 large underground tanks. The tanks, divided into 18 groups (or "farms"), are located in the 200 Area. Of the original single shell tanks, 66 of the 149 have leaked or are assumed to have leaked a combined amount of about 3.8 million liters (1 million gallons) of

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Figure 2-1. Hanford Site Location.

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-1. History of Operations for EM Program Facilities at Hanford.

Type of Operation	Operating Period	Hazardous Substances/Activities	Map Reference
Production Reactors			
105-B Reactor	1944 to 1968	AFP, TRU, Haz, Asb, Rad Equip	100-BC Area
105-D Reactor	1944 to 1967	AFP, TRU, Haz, Asb, Rad Equip	100-D Area
105-F Reactor	1945 to 1965	AFP, TRU, Haz, Asb, Rad Equip	100-F Area
105-H Reactor	1949 to 1965	AFP, TRU, Haz, Asb, Rad Equip	100-H Area
105-DR Reactor	1950 to 1965	AFP, TRU, Haz, Asb, Rad Equip	100-D Area
105-C Reactor	1952 to 1969	AFP, TRU, Haz, Asb, Rad Equip	100-BC Area
105-KW Reactor	1955 to 1970	AFP, TRU, Haz, Asb, Rad Equip, Irr Fuel	100-K Area
105-KE Reactor	1955 to 1971	AFP, TRU, Haz, Asb, Rad Equip, Irr Fuel	100-K Area
105-N Reactor	1963 to 1987	AFP, TRU, Haz, Asb, Rad Equip	100-N Area
Test Reactors			
PRTR	1961 to 1968	AFP, TRU, Haz, Asb, Rad Equip	300 Area
FFTF	1980 to 1994	AFP, TRU, Haz, Asb, Rad Equip, Irr Fuel	400 Area
Fuel Reprocessing			
T-Plant	1944 to 1956	AFP, TRU, Haz, Asb, Rad Equip	200-West Area
B-Plant	1945 to 1952	AFP, TRU, Haz, Asb, Rad Equip	200-East Area
REDOX	1952 to 1967	AFP, TRU, Haz, Asb, Rad Equip	200-East Area
PUREX	1955 to 1972	AFP, TRU, Haz, Asb, Rad Equip	200-East Area
Nuclear Materials Processing			
UO ₃ Plant	1951 to 1972 and 1984 to 1989	AFP, TRU, Haz, Asb, Rad Equip	200-West Area
Plutonium Finishing Plant	1949 to 1980 and 1984 to 1992	AFP, TRU, Haz, Asb, Rad Equip, SNM	200-West Area
U-Plant Uranium Recovery	1952 to 1957	AFP, TRU, Haz, Asb, Rad Equip	200-West Area
Fuel Fabrication	1943 to 1967	Haz, Rad Equip, Asb Uranium	300 Area
By-Product and Waste Processing			
Waste Scavenging (U-Plant)	1953 to 1957	AFP, TRU, Haz, Asb, Rad Equip	200-West Area
Cs and Sr Recovery (B-Plant)	1967 to 1979	AFP, TRU, Haz, Asb, Rad Equip	200-East Area
Cs and Sr Encapsulation (WESF)	1974 to 1985	AFP, Haz, Asb, Rad Equip	200-East Area
Waste Evaporators	1951 to 1989, 1 of 3 remains in service	AFP, TRU, Haz, Asb, Rad Equip	200-East and West Areas
High Level Liquid Waste Storage			
Single Shell and Double Shell Tanks	1944 to Present	AFP, TRU, Haz, Rad	200-East and West Areas
<div> <div> AFP - Radioactive Activation and Fission Products TRU - Transuranic Materials Haz - Hazardous Materials SNM - Special Nuclear Materials </div> <div> Asb - Asbestos Irr Fuel - Irradiated Reactor Fuel Rad Equip - Radioactively Contaminated Equipment </div> </div>			

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

contaminated liquid to the soil column. The 28 double shell tanks built since 1968 have an improved design for better containment (tank within a tank), and have not leaked.

The solid waste generated from past operations is stored as low-level radioactive waste, low-level mixed waste, transuranic waste, and hazardous waste. The current inventory of solid waste buried or stored in underground trenches and above-ground facilities is about 87,000 m³ (114,000 yd³) in the 100 Areas, 379,000 m³ (486,000 yd³) in the 200 Areas, and 159,000 m³ (208,000 yd³) in the 300 Area. Currently, the only active waste management sites for DOE related wastes are located in the 200 Areas. A commercial low-level radioactive waste disposal facility, operated by US Ecology, is located on Washington State leased land southeast of the 200 East Area.

After over 40 years of operations, the Hanford Site plutonium production mission has been completed, leaving a large amount of nuclear waste as part of its legacy. By volume, two-thirds of all the nuclear waste in the DOE complex is stored or disposed of at the Hanford Site. Over 1,600 contaminated waste sites associated with reactor areas, chemical processing areas, and fuel processing areas have been identified. Starting in 1986, the Hanford Site mission began changing from plutonium production to environmental restoration and remediation. Today, the Hanford Site mission is mainly directed toward environmental restoration.

2.2 ENVIRONMENTAL SETTING

The Hanford Site lies within the semi-arid Pasco Basin of the Columbia Plateau, in south-central Washington State (Figure 2-1). Public access to this land is restricted. Only about 6% of the total Hanford Site surface land area has been affected by Hanford Site operations.

2.2.1 Climate and Meteorology

The average annual precipitation at the Hanford Site is 16 cm (6.3 in.) Most precipitation occurs during the winter, with more than half of the annual amount occurring from November through February. The prevailing wind direction is from the northwest, in all months of the year, with frequent strong winds from the southwest. Daily maximum average temperatures range from 2°C (35°F) in late December and early January to 35°C (95°F) in late July. The annual average relative humidity is 54%. Humidity is highest during the winter months, averaging about 75%, and lowest during the summer, averaging about 35%.

2.2.2 Geology

The major geologic units in the Hanford Site area are the Miocene Columbia River Basalt Group (CRBG) and intercalated sedimentary rocks of the Ellensburg Formation. These are overlain by

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

younger (Mio-Pliocene) sedimentary rocks of the Ringold Formation, the early "Palouse" soil/Plio- Pleistocene Unit, and the Pleistocene cataclysmic flood deposits of the Hanford Formation (Figure 2-2).

The CRBG, which comprises the principal rock unit at the Hanford Site, is a sequence of flood basalt flows that erupted between 6 and 17 million years ago. The Ellensburg Formation consists of a series of sedimentary units that are interbedded between many of the basalt flows of the CRBG. The Ringold Formation overlies the youngest basalt flow, and consists of semi-consolidated clay, silt, pedogenically altered sediment, fine- to coarse-grained sand, and granule-to-cobble gravel. The primary facies of the Ringold Formation are fluvial gravels, fluvial sands, overbank deposits and paleosols, and lacustrine deposits. Ringold strata typically are situated below the water table.

The Plio-Pleistocene Unit is made up of sandy gravels that separate the Hanford Formation and the Ringold Formation in the east-central Cold Creek syncline and at the east end of the Gable Mountain anticline (east and south of the 200 East Area). These gravels are up to 25m (75 feet) thick. Along the western margin of the site, the "Palouse" soil separates the two formations. The Hanford Formation consists of pebble to boulder sized gravel, fine to coarse-grained sand, and silts that are unconsolidated deposits from ice age flooding of the area. The Hanford Formation generally lies above the water table throughout most of the Hanford Site, except in the 100 and 300 Areas.

2.2.3 Hydrology

2.2.3.1 Surface Water Hydrology. Surface water at the Hanford Site includes the Columbia River (northern and eastern sections), riverbank springs along the river, springs on Rattlesnake Mountain, onsite ponds, and offsite water systems directly east of and across the Columbia River. In addition, the Yakima River flows along a short section of the southern boundary of the Hanford Site.

2.2.3.2 Vadose Zone Hydrology. The hydrology in the vadose zone is influenced by the texture of the geologic units in the Hanford Formation, the thickness of the unsaturated sequence, low precipitation, and high evapotranspiration. These conditions significantly influence the time required for contaminants to reach the water table. Perched water is known to occur beneath active release sites, and is located above fine grained sediments. Extended drainage periods may persist following termination of surface and near-surface waste water disposal.

2.2.3.3 Groundwater Hydrology. The unconfined aquifer generally occurs in the semi-consolidated silts, sands, and gravels of the Ringold Formation. These sediments were deposited by the Columbia River as it meandered across the central Pasco Basin several million years ago. The Ringold Formation is less transmissive to water than Hanford Formation sediments. The aquifer ranges in saturated thickness from 0 m (near the margins of the Pasco Basin) to approximately 60 m (200 ft) near the center of the Basin.

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Figure 2-2. Major Geological Units at the Hanford Site.

Both natural and artificial sources of water recharge the aquifers within the Pasco Basin. The most significant volume source is irrigation water from the Columbia Basin Project, although the influence is limited to the area north of the Columbia River. Artificial recharge caused by Hanford Site operations historically has produced major groundwater mounds in the 200 East and 200 West Areas. The reduction or cessation of waste disposal has resulted in declines in water table elevations, and has changed contaminant plume characteristics.

Groundwater plumes move in directions that are approximately perpendicular to the water table elevation contours. Chemical and radiological contaminants detected in the groundwater above DWS are shown in Figures 2-3 and 2-4. During the Hanford Site's operating history, changes in the volume of liquid waste disposed to the soil column have altered the shape of the water table, resulting in alterations to migration patterns.

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Figure 2-3. Distribution of Chemical Contaminants in Groundwater.

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Figure 2-4. Distribution of Radioactive Contaminants in Groundwater.

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The interaction between the groundwater and the Columbia River is an important element in assessing contaminant impacts on the river system. River water moves in and out of the banks during daily stage fluctuations, causing variable water quality characteristics in shoreline monitoring wells. In addition, the interface zone between the river and the aquifer has characteristics that may retard or modify contaminants that are transported by groundwater.

2.2.4 Water Quality of the Columbia River

The State of Washington has classified the stretch of the Columbia River from the Grand Coulee Dam to the Washington-Oregon border (which includes the Hanford Reach) as Class A, Excellent. Class A waters are required to be suitable for essentially all uses, including raw drinking water, recreation, and wildlife habitat. State and federal DWS apply to the Columbia River and are currently being met. Radionuclides consistently detected in the river during 1994 included tritium, strontium, iodine, plutonium, and uranium. Radionuclide measurements of total alpha and total beta were similar to the previous year, or approximately 5% or less of the applicable DWS of 15 and 50 pCi/L, respectively. Tritium measurements continue to be below state and federal DWS. Nonradiological constituents detected in the river consist mostly of metals and anions, in concentrations below state and federal DWS. All nonradiological water quality standards are met for this Class A-designated water.

Groundwater contaminants from the Hanford Site's past waste disposal practices continue to enter the Columbia River from riverbank springs and seeps, as well as from the interface between the river bed and groundwater. Aluminum, chromium, iron, manganese, nitrate, and trichloroethylene, as well as strontium, technetium, tritium, and uranium, are entrained in groundwater plumes that intersect the river along the 100 Area shoreline. Aluminum, iodine, iron, manganese, nitrate, technetium, and tritium entered the river along the portion of shoreline extending from the old Hanford Townsite to below the 300 Area. Chromium, and uranium were discharged to the river along the 300 Area shoreline, in addition to the other contaminants. The contaminant concentrations in spring water are typically similar to, but lower than, those found in near-shore groundwater wells. Chromium in excess of federal ambient water quality criteria for the protection of aquatic life has been detected at the riverbed/ groundwater interface along portions of the 100 Area shoreline. Chromium levels in this pore water are above protective levels for salmon alevin hatched from salmon redds (nests) in the gravel river bottom in the Hanford Reach area of the river. The Hanford Reach is the last remaining free-flowing section of the river.

2.2.5 Ecology

The ecology of the Hanford Site is characterized as a shrub-steppe ecosystem. Fifteen different soil types have been described, varying from sand to silt and sandy loam. Shrub-steppe ecosystems are typically dominated by a shrub overstory with a grass understory. The existing

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plant communities at the Hanford Site are becoming increasingly more important from an ecological perspective. Expanding agricultural and urbanization developments in the Columbia Basin region continue to destroy and fragment the few remaining large tracts of shrub-steppe habitat. The shrub-steppe habitat is considered a priority habitat by Washington State because of its relative scarcity, and because of its requirement as nesting/breeding habitat for several state and federal species of concern. A 1994 survey of Hanford Site plants and animals by the Nature Conservancy of Washington discovered 18 species of insects and 3 plants that are new to science. This report stated that the Hanford Site is now known to support more than 100 populations of 15 rare native plant taxa, making the Hanford Site a botanical "island of diversity" in the shrub-steppe of the lower Columbia Basin.

Several areas, totaling 670 km² (260 mi²) on the Hanford Site, have been designated for research or as wildlife refuges. These include the Fitzner Eberhardt Arid Lands Ecology (ALE) Reserve (managed by DOE); the Saddle Mountain National Wildlife Refuge (managed by U.S. Fish and Wildlife Service); and the Wahluke Slope Wildlife Area (managed by the Washington State Department of Wildlife).

2.2.5.1 Vegetation. Of the 590 species of vascular plants recorded for the Hanford Site, approximately 20% are considered non-native. Native shrublands occupy the largest area in terms of acreage, and comprise 7 of the 9 major plant communities at the Hanford Site. Of the shrubland types, sagebrush-dominated communities are the predominant type, with other shrub communities varying with changes in soil and elevation. Common shrubs include native big sagebrush, three-tip sagebrush, antelope bitterbrush, gray rabbitbrush, and spiny hopsage. Common native grasses include bluebunch wheatgrass, Sandberg's bluegrass, needle-and thread grass, Indian ricegrass, bottlebrush squirreltail, and prairie junegrass. Cheatgrass has replaced many native perennial grass species, and is well established in many low-elevation (<244 m [800 ft]) and/or disturbed areas. Trees afford unique terrestrial habitat at the Hanford Site. Currently, approximately 23 species of trees occur on the site. The most commonly occurring species are black locust, Russian olive, cottonwood, mulberry, sycamore, and poplar. Many of these non-native species are aggressive colonizers and have become established along the Columbia River (e.g., mulberry, poplar, Russian olive), serving as a functional component of the riparian zone.

Riparian habitat includes sloughs, backwaters, shorelines, islands, and palustrine areas associated with the Columbia River flood plain. Vegetation that occurs along the river shoreline includes emergent water milfoil, water smartweed, pondweed, sedge, reed canarygrass, and bulbous bluegrass. Trees include willow, mulberry, and Siberian elm. Other riparian vegetation occurs in association with perennial springs, seeps, artificial ponds and ditches on the Hanford Site.

Emergent riparian (wetland) habitat occurs infrequently along the Hanford Reach, and has important ecological significance because of the net loss of wetland habitat elsewhere within the region. Emergent species include reed canarygrass, common witchgrass, large barnyard grass, rushes, and sedges.

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2.2.5.2 Wildlife. Included in the 290 species of terrestrial vertebrates observed on the Hanford Site are approximately 40 species of mammals, 240 species of birds, 3 species of amphibians, and 9 species of reptiles. Grasshoppers and darkling beetles are among the more conspicuous of the approximately 600 species of insects that have been found on the Hanford Site. Species of potential concern to remediation activities include mule deer, coyote, badger, beaver, black-tailed jackrabbit, Nuttall's Cottontail, the Great Basin pocket mouse, deer mouse, bald eagle, ferruginous hawk, Swainson's hawk, burrowing owl, loggerhead shrike, long-billed curlew, sage sparrow, mallard duck, and Canada goose.

2.2.5.3 Aquatic Ecosystems. The Columbia River is the dominant aquatic ecosystem at the Hanford Site, and supports a large and diverse community of plankton, benthic invertebrates, fish, and other communities. The Columbia River has been dammed both upstream and downstream from the Hanford Site, and the reach flowing through the area is the last free-flowing, but regulated, section of the Columbia River in the United States above Bonneville Dam. No tributaries enter the Columbia during its passage through the Hanford Site.

There have been 44 species of fish identified in the Hanford Reach. Of these species, chinook salmon, sockeye salmon, coho salmon, and steelhead trout use the river as a migration route to and from upstream spawning areas and are of the greatest economic importance. Both chinook salmon and steelhead trout also spawn in the Hanford Reach. Other fish of importance to tribal entities and sport fishermen are whitefish, shad, sturgeon, smallmouth bass, crappie, catfish, walleye, and perch. The destruction of other mainstream Columbia spawning grounds by dams has substantially increased the relative importance of the Hanford Reach spawning areas.

2.2.5.4 Threatened and Endangered Species. Threatened and endangered plants and animals identified at the Hanford Site, as listed by the state and federal governments, are shown in Table 2-2. No plants or mammals on the federal list are known to occur on the Hanford Site. There are, however, three species of birds on the federal list of threatened and endangered species, and several species of plants and animals that are under consideration for formal listing by both state and federal governments.

Several state and federal species of concern use the shrub-steppe habitat for nesting/breeding activities. Because of its importance to these species, and its relative scarcity, the state of Washington considers the shrub-steppe a priority habitat.

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING**Table 2-2. Threatened (T) and Endangered (E) Species.**

Common Name	Scientific Name	Federal	State
Mammals			
Pygmy rabbit ^(a)	<i>Brachylagus idahoensis</i>		E
Birds			
Aleutian Canada goose ^(b)	<i>Branta canadensis leucopareia</i>	T	E
American white pelican	<i>Pelecanus erythrorhynchos</i>		E
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	T
Ferruginous hawk	<i>Buteo regalis</i>		T
Peregrine falcon ^(b)	<i>Falco peregrinus</i>	E	E
Sandhill crane ^(b)	<i>Grus canadensis</i>		E
Plants			
Columbia milk-vetch	<i>Astragalus columbianus</i>		T
Columbia yellowcress	<i>Rorippa columbiae</i>		E
Dwarf evening primrose	<i>Oenothera pygmaea</i>		T
Hoover's desert parsley	<i>Lomatium tuberosum</i>		T
Northern wormwood ^(a)	<i>Artemisia campestris borealis</i> var. <i>wormskioldii</i>		E
Insects			
Oregon silverspot butterfly ^(a)	<i>Speyeria zerone</i>	T	T
(a) Probably not currently occurring on the site.			
(b) Incidental occurrence.			

2.3 CURRENT AND ADJACENT SITE USES

The Hanford Site includes several operational areas, as well as wildlife refuges and a dedicated ecological study area (Figure 2-5). The entire Hanford Site has been designated as a National Environmental Research Park. The major operational areas on the Hanford Site include the 100, 200, 300, and 400 Areas. Other operational areas include the 600, 1100, and 3000 Areas.

The 100 Area borders the south shore of the Columbia River, and consists of six separate areas that contain the nine retired plutonium production reactors. The 200 West and 200 East Areas are located on a plateau about 8 and 11 km (5 and 7 mi), respectively, from the Columbia River. These areas have been dedicated for some time to chemical reprocessing of reactor fuel, waste management, and waste disposal activities. The 300 Area, located just north of the city of Richland, is the site of nuclear research and development. Its primary function was fuel fabrication. The 400 Area is about 8 km (5 mi) north of the 300 Area, and is the site of the FFTF and Fuels and the Materials Examination Facility (FMEF).

The 600 Area includes all of the Hanford Site that is not occupied by the 100, 200, 300, 400, 1100, and 3000 Areas. Current land uses within the 600 Area include the following:

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Figure 2-5. Geographic Areas for Future Land Use Planning.

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- The ALE Reserve, which is set aside for ecological studies.
- A parcel located on the central plateau that is leased by Washington State for commercial low-level radioactive waste disposal, and another parcel to the Southeast reserved for potential disposal of nonradioactive hazardous wastes.
- An area designated for commercial power production by the Washington Public Power Supply System.
- A national wildlife refuge that is managed by the U.S. Fish and Wildlife Service.
- A recreational game management area that is managed by the Washington State Department of Fish and Wildlife (the Wahluke Wildlife Area).

The 1100 Area is just north of Richland and includes transportation services, repair and maintenance, and shipping and receiving for the Hanford Site. The 3000 Area is just east of the 1100 Area, and includes office facilities for DOE contractors.

The primary uses of the Columbia River include the production of hydroelectric power, extensive irrigation in the Mid-Columbia Basin, drinking water for cities and towns located along the river, and drinking water and other industrial uses by several onsite facilities. In addition, the river and its immediately adjacent areas are used extensively for recreation, including fishing, hunting, boating, sailboarding, water-skiing, diving, and swimming. Some land access along the shore and on certain islands is available for public use.

Land use in other areas adjacent to the Hanford Site includes urban and industrial development, irrigated and dry-land farming, and grazing (see Figure 2-6). In 1993, wheat represented the largest single crop in terms of area planted in Benton, Franklin, and Grant counties. Alfalfa, apples, asparagus, cherries, corn, grapes, and potatoes are other major crops in Benton, Franklin, and Grant counties.

2.4 INFLUENCING FACTORS

2.4.1 The Local and Regional Socioeconomic Influence of the Hanford Site

Hanford Site activities dominate the local employment picture, and provided almost 25% of the total nonagricultural jobs in Benton and Franklin counties during 1994. The Hanford Site's payroll has a significant, widespread impact on the Tri-Cities and state economies, in addition to providing direct employment. The involvement of local government and interested parties in decision making is extensive.

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Figure 2-6. Land Use Adjacent to the Hanford Site.

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2.4.2 Archaeological, Historical, and Native American Resources

2.4.2.1 Archaeological Resources. There have been 283 archaeological sites found at the Hanford Site. Archaeological sites common to the Hanford Site include the remains of numerous pit house villages, various types of open campsites, cemeteries, hunting camps, and game drive complexes adjacent to the river corridor; quarries and spirit quest monuments on mountains and rocky bluffs; hunting/kill sites in lowland stabilized dunes; and small temporary camps near perennial sources of water located away from the river. The Hanford Site is a *de facto* reserve of archaeological information of the kind and quality that have been lost elsewhere in the region, and this information is of critical cultural significance to the four tribal entities. There are 48 archaeological sites included on the *National Register of Historic Places* (National Register). However, the majority of identified archaeological sites remain unevaluated. Archeological sites are currently being evaluated on a subproject by subproject basis.

2.4.2.2 Historical Resources. A total of 201 historic archaeological sites associated with the pre-Hanford Site era have been recorded. Properties from the pre-Hanford Site era include semi-subterranean structures near McGee Ranch; the Hanford Irrigation and Power Company's pumping plant at Coyote Rapids; the Hanford Irrigation Ditch; the old Hanford Townsite, pumping plant, and high school; Wahluke Ferry; the White Bluffs Townsite and bank; the Richmond Ferry; Arrowsmith Townsite; a cabin at East White Bluffs ferry landing; the White Bluffs road; the Chicago, Milwaukee, St. Paul, and Pacific Railroad (Priest Rapids-Hanford Line) and associated whistle stops; and Bruggeman's fruit warehouse. The National Register status of these historic archaeological sites is undetermined. Pre-Hanford historic sites are currently being evaluated on a subproject by subproject basis.

There are approximately 1,100 buildings and structures on the Hanford Site associated with the Manhattan Project and Cold War eras. These buildings are primarily found in the 100, 200, and 300 Areas. The most important of these are the inactive nuclear reactors and inactive plutonium-production and processing facilities. Plutonium for the first atomic explosion, and for the device that destroyed Nagasaki to end World War II, were produced in the 105-B Reactor, which is listed in the National Register. Additional reactors and processing facilities were constructed after World War II, within the Cold War period. All reactor containment buildings still stand, although many ancillary structures have been removed. Less than 10% of the Manhattan Project and Cold War era buildings have been evaluated for eligibility for the National Register. An Historic Buildings Task Force has been formed during FY96 to evaluate all Manhattan Project and Cold War era buildings. The task force will draft a programmatic agreement for the management of eligible buildings.

2.4.2.3 Native American Resources. The Washani religion, which has ancient roots in the region, is still practiced by the Wanapum People, and many people on the Yakama, Umatilla, Warm Springs, and Nez Perce reservations. Native plant and animal foods, some of which can

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be found only on the Hanford Site, are used in the ceremonies performed by tribal members. Certain landmarks, especially Rattlesnake Mountain, Gable Mountain, Gable Butte, Goose Egg Hill, and various sites along and including the Columbia River, are sacred to these people.

The Native American tribes who inhabited the area encompassing the Hanford Site prior to the arrival of the European settlers signed treaties with the U.S. government in 1855. These treaties ceded certain lands to the United States in exchange for settlement on reservation lands, with the exception of the Wanapum People, who did not sign a treaty. Separate treaties were signed in 1855 between Governor Stevens, on behalf of the United States, and the Yakama Indian Nation; the Nez Perce Tribe; and the Umatilla, Cayuse and Walla Walla tribes. These treaties reserved specific rights to the tribes, including those related to hunting, fishing, gathering foods and medicines, and pasturing livestock on the open and unclaimed portions of those ceded lands. The entire Hanford Site is within the boundaries of the lands ceded by the tribes. Treaty rights may have a significant bearing on the determination of future land uses after cleanup and/or upon declaration of excess land by DOE.

2.4.2.4 Strategy And Implementation Influences. There are currently 645 archaeological, historic, and Native American sites and isolated finds recorded in the files of the Hanford Cultural Resources Laboratory (HCRL). However, since less than 10% of the Hanford Site has been surveyed, the total number of resources has not been determined. Areas of potential impact are surveyed on a subproject by subproject basis. Funds to conduct surveys outside of the *National Historic Preservation Act* (NHPA) Section 106 process are not available. The majority of known archaeological and Native American sites occur along the Columbia River. This corridor was the focus of early Euroamerican utilization, as well as the location for the later fuel manufacturing and irradiation activities. These intermixed cultural histories still remain to be identified, evaluated, and (where necessary) mitigated as environmental restoration proceeds.

Given the sensitivity of the tribal entity issues at the Hanford Site, and the rights afforded the tribes through the Treaties of 1855, the tribes with ancestral ties to the Hanford Site are consulted as part of each project. Their involvement begins with the early stages of the planning process and lasts through completion of restoration.

The existing natural and cultural resources are of great interest and value to the general public, the tribal entities, other stakeholders, and Hanford Site trustees. These resources have been the subject of much discussion. Sensitive habitat and wildlife associations have been identified and mapped. Consideration of natural and cultural resources is essential to the planning of future Hanford Site uses. The surrounding counties have convened public meetings to discuss natural and cultural resources, and to delineate sections of the Hanford Site for selected uses based upon the relative value of these resources.

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2.5 FACILITIES, EQUIPMENT, AND INFRASTRUCTURE

The major operational areas comprising the Richland ER Project are identified as the 100, 200, 300 and 400 Areas (as discussed in Section 2.3). The geographic location of these areas is presented in Figure 2-1.

A summary of the facilities, equipment and infrastructure located within these major operational areas is presented in Table 2-3. Additional information concerning this specific inventory is presented in Table 2-4 (presented at the end of this section), which provides the following:

1. Facility or infrastructure location by area
2. Name or brief description of the facility
3. Condition (type of contamination)
4. Schedule of facility to be transitioned to the Richland ER Project
5. Size or capacity
6. Status - whether active or inactive
7. Other important information

Table 2-3. Facilities/Equipment/Infrastructure Summary.

Location	Summary Information
100 and 300 Areas	<ul style="list-style-type: none">• 129 facilities within 1/2 mile of Columbia River• Constructed between mid-1940s and 1950s• Minimal maintenance since declared surplus• Limited deactivation• Radioactive and chemical contaminants
200 Area	<ul style="list-style-type: none">• 49 facilities• 360 facilities under transition to ER Project• Constructed between mid-1940s and late 1950s• Minimal maintenance since declared surplus• Limited deactivation• Radioactive and chemical contaminants

2.6 FUTURE LAND USE

Table 2-5 provides a current status of Hanford Site lands. All of the Hanford Site is under DOE ownership. The Hanford Site is expected to remain in a limited access status under RL management for security, public health, and safety reasons for the foreseeable future. RL is sponsoring several ongoing efforts to identify future land uses of the Hanford Site. These efforts include development of the draft *Hanford Remedial Action Environmental Impact Statement* (HRA-EIS), the *Comprehensive Land Use Plan* (CLUP), and the FSUWG.

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Table 2-5. Status of Lands.

Installation/ Site	Private Lands			DOE Lands				
	Total to be Addressed Hectares/Acres	Safely Contained	Total Completed and Released	Total Owned by DOE Hectares/Acres	DOE Land to be Retained	Land That Has Been Released	Remediated and Ready for Release	Land Not Ready to be Released
100 Area	0	0	0	6,880 H 17,000 A	6,880 H 17,000 A	0	0*	6,880 H 17,000 A
200 Area	0	0	0	2,425 H 6,000 A	2,425 H 6,000 A	0	0	2,425 H 6,000 A
300 Area	0	0	0	47 H 115 A	47 H 115 A	0	0*	47 H 115 A
1100 Area	0	0	0	486 H 1200 A	486 H 1200 A	0	0*	486 H 1200 A
Other	0	0	0	135,207 H 334,085 A	135,207 H 334,085 A	0	0	135,207 H 334,085 A
Total	0	0	0	145,045 H 358,400 A	145,045 H 358,400 A	0	0	145,045 H 358,400 A

* Some land will be made accessible for other uses (e.g., Arid Lands Ecology, North Slope, and land along the Columbia River).

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The Richland ER Project manages remedial action activities in accordance with substantive elements of the *National Environmental Policy Act* (NEPA), within the process under CERCLA. The development of a coordinated strategy for remediation of the Hanford Site hazardous and radioactive waste sites is also facilitated by integrating the consideration of potential future Hanford Site uses into remediation decisions.

For purposes of analysis, the FSUWG divided the Hanford Site into six distinct geographic areas. These areas are depicted in Figure 2-5. The FSUWG proposed a range of three possible cleanup scenarios for the six geographical areas. These scenarios are defined as follows:

- **Unrestricted Land Use** - Contamination does not preclude any human uses. However, access or certain uses may be prohibited for other reasons (e.g., physical hazards, cultural resource protection, habitat protection).
- **Restricted Land Use** - Residual contamination precludes some human uses. Restrictions could apply to the surface soils, subsurface soils, surface water, or groundwater.
- **Exclusive Land Use** - Potential health risks limit uses and require strict controls on access. Use of the area would be limited to the management and/or disposal of radioactive and hazardous materials and similar, compatible uses. Control of the area would be maintained by DOE. Exclusive uses areas could include buffer zones around active facilities.

The Future for Hanford: Uses and Cleanup, A Final Report of the Hanford Future Site Uses Working Group (FSUWG Report) outlined several potential land use scenarios for each geographical area, based upon the definitions given above. The *FSUWG Report* also made nine recommendations that serve as a basis for stakeholder input to future land use decisions relative to each geographical area.

Pursuant to the requirements of NEPA, DOE has determined that the proposed action to develop future land use objectives for the Hanford Site is a major federal action, and as such requires the preparation of an Environmental Impact Statement (EIS). The EIS addresses these requirements by evaluating the environmental impacts of remedial activities necessary to achieve a range of alternative future land-use objectives for the Hanford Site. However, the draft HRA-EIS only reflects alternatives for four of the six geographic areas. The other two geographic areas of the site, the Fitzner/Eberhardt ALE Reserve and the North Slope, have already been remediated under CERCLA and therefore are not covered by the draft HRA-EIS.

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Alternatives for establishing future land-use objectives of the Hanford Site were developed using input from the scoping process, including the *FSUWG Report* and comments received from members of the public, interested groups, federal, state, and local governments, and tribal entities. Under this approach, the future land-use designation for each of the potential alternatives would determine the level of remediation required for each area. Table 2-6 identifies the relationships between the future land-use alternatives and the future use options identified by the FSUWG for each geographical area. Likewise, each future land-use alternative is associated with an exposure scenario. The exposure scenarios presented in the *Hanford Site Risk Assessment Methodology (HSRAM)* define the conditions under which humans and ecological receptors could be exposed to residual contamination. These conditions are directly related to land use. The DOE, EPA, and Ecology have agreed to use appropriate exposure scenarios in the CERCLA process to assist in evaluative risk levels associated with remediation goals for waste sites within each area. Remediation goals are set by RODs, and have been based on Applicable, Relevant, and Appropriate Requirements (ARARs).

Based on programmatic needs and stakeholder input, DOE identified a preliminary Preferred Future Land-Use Alternative for each of the four geographic areas of the Hanford Site, as follows.

Columbia River, Restricted Future Land-Use Alternative

This alternative relies on minimization of physical hazards and contaminants through the use of engineering and/or institutional controls, and would result in residual contaminant levels requiring some restrictions on human use. Under a Restricted Future Land-Use Alternative, current unrestricted access to the Columbia River for recreational use would be maintained. Restrictions would continue to apply to shoreline and island access and disturbance of riverbank and river bottom sediments. Use and access restrictions would be enforced by institutional controls (i.e., fencing, signs, and deed restrictions). This alternative enables future land uses consistent with those proposed by the FSUWG. The CERCLA exposure scenario associated with this alternative is recreational.

Reactors on the River, Restricted Future Land-Use Alternative

This alternative includes excavation of contaminated soil and remediation of past-practice waste units and groundwater, in conjunction with closure of treatment, storage, and disposal (TSD) facilities and decommissioning of surplus contaminated and uncontaminated facilities. Under this alternative, the reactors in the Columbia River geographic area will be remediated to levels that require restrictions on land use due to residual contamination, physical hazards, and/or protection of cultural resources and sensitive wildlife habitat. Restrictions will apply to activities that could disturb subsurface soil in or around remediated waste sites. In addition, withdrawal and use of groundwater will be controlled for an indefinite period. Institutional controls

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Table 2-6. Relationship Between Future-Land Use Alternatives, Hanford Future Sites Uses Working Group Options, Exposure Scenarios, and Potential DOE Land-Use Options.

FUTURE LAND-USE ALTERNATIVES	EXPOSURE SCENARIOS	WORKING GROUP LAND-USE OPTIONS	POTENTIAL DOE LAND-USE OPTIONS
COLUMBIA RIVER			
Unrestricted	Agricultural	1. Wildlife and Recreation 2. Recreational and Related Commercial, Scenic and Economic Uses 3. Native American Uses	1. Sensitive Areas
Restricted	Recreational		
REACTORS ON THE RIVER			
Unrestricted	Agricultural	1. Native American Uses 2. Wildlife and Recreation 3. Limited Recreation, Commercial Uses, and Wildlife 4. B Reactor as a Museum/Visitor's Center	1. Sensitive Areas 2. Undeveloped Areas
Restricted	Recreational		
CENTRAL PLATEAU			
Exclusive	Industrial	1. Onsite Waste and Existing Obligations for Disposal 2. Option 1 plus Offsite DOE Waste for Treatment only 3. Option 2 plus Offsite Commercial HAZ Waste for Treatment only 4. Option 3 plus Offsite DOE Waste: long-term storage for TRU and HLW and Disposal of LLW 5. Option 4 plus MRS for Commercial Spent Reactor Fuel 6. Option 5 plus Compatible Commercial or Industrial Activity	1. Waste Operations 2. R&D/Engineering Development
ALL OTHER AREAS			
Restricted	Recreational and Industrial	1. Focus on Economic Development 2. Focus on Wildlife 3. Native American Uses 4. Agricultural Use	1. Operations Support 2. R&D/Engineering Development 3. Undeveloped Areas 4. Sensitive Areas 5. Administrative Support

TRU Transuranic
HLW High Level Waste
LLW Low Level Waste

R&D Research and Development
MRS Monitored Retrievable Storage

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(i.e., signs, fencing, and deed restrictions) will be used, as necessary, to restrict use and access. This alternative enables future land uses consistent with those proposed by the FSUWG. The CERCLA exposure scenario associated with this alternative is recreational.

Central Plateau, Exclusive Future-Land Use Alternative

This alternative achieves exclusive use primarily through application of engineering and institutional controls (e.g., capping of past-practice waste units and TSD facilities). DOE maintains institutional control, and the central plateau area will continue to be used for waste management and similar activities. Restrictions will apply to public access, withdrawal and use of groundwater, and soil disturbing activities. A temporary surface and subsurface buffer zone will surround the central plateau geographic area in order to protect human health and safety. In response to comments made during the scoping process, RL will assure that this alternative allows certain restricted tribal entities to use portions of the central plateau geographic area. This alternative enables future land uses consistent with those proposed by the FSUWG. The CERCLA exposure scenario associated with this alternative is industrial.

All Other Areas, Restricted Future Land-Use Alternative

This alternative relies on the use of engineering and institutional controls, as well as removal and treatment of contaminants (including groundwater contaminants). Activities similar to those allowable under current site management will continue. Restrictions will apply to activities that could disturb subsurface soil in or around remediated waste sites. In addition, withdrawal and use of groundwater will be controlled for an indefinite period. Institutional controls (i.e., signs, fencing, and deed restrictions) will be used, as necessary, to restrict use and access. This alternative enables future land uses consistent with those proposed by the FSUWG. The CERCLA exposure scenario associated with this alternative is industrial for the 300 Area, and recreational for the rest of the geographic area.

While these are the preferred alternatives, it should be noted that the draft HRA-EIS is still in its draft form. It is currently scheduled for submittal to the review/comment cycle during the second quarter of FY96.

In addition to development of the draft HRA-EIS, RL has initiated development of a CLUP for the Hanford Site. The CLUP is of great importance and usefulness to RL, tribal entities, and many public interest groups that have an interest in the site. The plan will identify future land uses, given the proposed restrictions in the draft HRA-EIS. The CLUP implements the preferred alternative of the draft HRA-EIS, and provides the institutional control mechanism for future land use. The CLUP will be implemented over specific time frames, and will be updated as needed. The CLUP is currently scheduled for submittal to the review/comment cycle during the second quarter of FY96.

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Table 2-4. Facility and Infrastructure List. (Page 1 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
100-B	Riverlines (2)	100-B	Unk	Complete	N/A	Inactive	
100-B	Unirradiated Fuel Storage	103-B	None	Complete	128m2	Inactive	Cleaned & used for storage
100-B	Tritium Vault	104-B-1	Rad	Complete	12.1m2	Inactive	Roof in poor condition
100-B	Tritium Laboratory	104-B-2	Rad	Complete	3.7m x 7.3m	Inactive	Roof in poor condition
100-B	Reactor Building	105-B	Rad/Haz	Complete	5000m2	Inactive	National Historic Site
100-B	111-B Decontamination Station	111-B	Rad/Haz	Complete	N/A	Inactive	Foundation, Floor, and Waste Tank Remain
100-B	Reactor Exhaust Air Stack	116-B	Rad	Complete	64m High	Inactive	
100-B	Exhaust Air Sample Building	119-B	None	Complete	4.6 x 7.3 m	Inactive	
100-B	Vacuum Seal House	1608-B	Unk	Complete	3.7m x 3.7m	Inactive	
100-B	Exclusion Area Badge House	1701-BA	None	Complete	6.1m x 6.1m	Inactive	
100-B	Outfall Structure	1904-B-1	Unk	Complete	N/A	Inactive	
100-B	Outfall Structure	1904-B-2	Unk	Complete	N/A	Inactive	
100-C	100-C Riverlines (2)	100-C	Rad	Complete	N/A	Inactive	
100-C	High Tanks (2)	105-C	None	Complete	TBD	Inactive	
100-C	Reactor Building & Fuel Storage Basin	105C	Rad/Haz	Complete	5000m2	Inactive	
100-C	Water Tunnels	105-C	Rad	Complete	N/A	Inactive	
100-C	HCR Rod Storage	118-C-4	Rad	Complete	TBD	Inactive	
100-C	Badge House	1702-C	Haz	Complete	19.5m2	Inactive	
100-C	Solvent House	1714-C	Haz	Complete	14.5m2	Inactive	
100-C	Filter Plant	183-C	Rad	Complete	96m x 87m	Inactive	This facility is being demolished
100-C	Main Pump House	190-C	Haz/Rad	Complete	60m x 56m	Inactive	This facility is being demolished
100-D	Riverlines (2)	100-D	Unk	Complete	N/A	Inactive	
100-D	Unirradiated Fuel Stg Bldg.	103-D	Rad	Complete	16.2m x 8.2m	Inactive	
100-D	Water Tunnels	105-D	Unk	Complete	N/A	Inactive	
100-D	Reactor Building & Fuel Storage Basin	105-D	Rad/Haz	Complete	5000m2	Inactive	
100-DR	Riverline (1)	100-DR	Rad	Complete	N/A	Inactive	
100-DR	Reactor Building & Fuel Storage Basin	105-DR	Rad/Haz	Complete	5000m2	Inactive	
100-DR	Water Tunnels	105-DR	Unk	Complete	N/A	Inactive	
100-D	Outfall Structure	1904-D	Rad	Complete	N/A	Inactive	
100-D	Reactor Exhaust Stack	116-D	Rad	Complete	61m High	Inactive	

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2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 2 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
100-DR	Waste Water Pump Station	1608-DR	Rad	Complete	TBD	Inactive	Foundation and below grade structure remain
100-DR	Main pump House and N.& S. Annex	190-DR	None	Complete	5,886 m2	Inactive	
100-F	Riverlines (2)	100-F	Unk	Complete	N/A	Inactive	
100-F	Reactor Building & Fuel Storage Basin	105-F	Rad	Complete	5000m2	Inactive	
100-F	Biology Laboratory	108-F	Rad/Haz	Complete	1858m2	Inactive	
100-F	West Clear Well	183-F	Unk	Complete	N/A	Inactive	Used as inert landfill
100-F	Wastewater Pumping Station	1608-F	Unk	Complete	TBD	Inactive	Foundation and below grade structure remain
100-H	Riverlines (2)	100-H	Rad	Complete	N/A	Inactive	
100-H	Reactor Building & Fuel Storage Basin	105-H	Rad/Haz	Complete	5000m2	Inactive	
100-H	Warehouse	1713-H	None	Complete	18.9m x 22m	Inactive	Presently used as storage
100-H	Arsenal	1720-HA	None	Complete	1.8m x 2.4m	Inactive	
100-H	Solar Evaporation Basin	183-H	Rad	Complete	N/A	Being Demolished	RCRA Permitted TSD-Undergoing closure
100-H	West Clearwell	183-H	Unk	Complete	N/A	Inactive	Used as an inert landfill
100-K	Riverlines (2)	100-K	Rad	Complete	N/A	Inactive	
100-K	Water Tunnels	105-KE	Unk	Complete	N/A	Inactive	
100-K	Reactor Building	105-KE	Rad/Haz	Reactor Complete (see other)	7, 638 m2	Inactive	WHC is responsible for the fuel storage basin & transfer bay area.
100-K	Water Tunnels	105-KW	Unk	Complete	N/A	Inactive	
100-K	Reactor Building	105-KW	Rad/Haz	Reactor Complete	7,638 m2	Inactive	WHC is responsible for the fuel storage basin & transfer bay area.
100-K	Gas Storage Facility	110-KE	None	Complete	NA	Inactive	Only CO2 Tanks Remain
100-K	Gas Storage Facility	110-KW	None	Complete	N/A	Inactive	
100-K	Gas Recirculation Building	115-KE	Rad	Complete	34.6m x 10.4m	Inactive	
100-K	Gas Recirculation Building	115-KW	Rad	Complete	34.6m x 10.4m	Inactive	
100-K	Exhaust Air Stack	116-KE	Rad	Complete	91.4m High	Inactive	
100-K	Exhaust Air Stack	116-KW	Rad	Complete	61.0m High	Inactive	
100-K	Exhaust Air Filter Building	117-KE	Rad	Complete	18m x 11.9	Inactive	
100-K	Exhaust Air Filter Bldg	117-KW	Rad	Complete	18m x 11.9	Inactive	

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2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 3 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
100-K	HCR Storage Cave	118-KE-2	Rad	Complete	TBD	Inactive	
100-K	HCR Storage Cave	118-KW-2	Rad	Complete	TBD	Inactive	
100-K	119-KW Exhaust Air Sampling Bldg	119-KW	Rad	Complete	20.5 m2	Inactive	
100-K	Heat Recovery Facility	150-KE	Rad	Complete	85m2	Inactive	
100-K	Heat Recovery Facility	150-KW	Rad	Complete	85m2	Inactive	
100-K	Power Control Building	165-KW	None	See other	TBD	Active	WHC is responsible for the switchgear portion of the building.
100-K	Oil Storage Vault	166-KE	Haz	Complete	26.7 m2	Inactive	
100-K	Oil Storage Vault	166-KW	Haz	Complete	26.7 m2	Inactive	
100-K	Crosstie Tunnel Building	167-K	None	Complete	5.0m x 4.6m	Inactive	
100-K	Warehouse	1713-KER	None	Complete	TBD	Inactive	
100-K	Administrative Office Building	1720-K	None	Complete	333 m2	Inactive	Used for storage
100-K	Outfall Structure	1908-K	RAD	Complete	N/A	Inactive	
100-K	River Pumphouse	181-KW	None	Complete	TBD	Inactive	
100-K	Emer. Water Pump House	182-K	None	Complete	242m2	Inactive	
100-K	KE-KW Pipe Tunnels	183-K	None	Complete	N/A	Inactive	ERC manages all of the 183-KW facility subsets, with the exception of 183.1-KW
100-K	LAB	1706-KER/KEL/KE	HAZ / RAD	2000	TBD	Active	
100-K	Filter Plant	183-KW	Haz	OTHER	1686.1 m2	Active/ Inactive	EM-40 is responsible for all of the 183-KW facility and its subsets with the exception of the 183.1 KW chlorine vault which is under the responsibility of WHC.
100-K	Process Water Pumphouse (see Other)	190-KW	None	OTHER	4287.1 m2	Inactive	EM-40 is responsible for the S. and E. portion of the building
100-N	Riverline (1)	100-N	Unk	Complete		Inactive	
100-N	Storage Building	104-N	Haz	Complete	53.5 m2	Inactive	Inactive N Facilities are being moved from within the N Pilot Project into the Surplus Facilities as they are deactivated and prepared for long-term surveillance and maintenance.
100-N	Reactor Building & Fuel Storage Building	105-N	Rad	Complete	9, 242 m2	Inactive	

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2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 4 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
100-N	Emergency Diesel Enclosure	105-NA	Rad	Complete	17.8 m2	Inactive	
100-N	Mechanical Building Addition	105-NB	Haz	Complete	687.5 m2	Inactive	
100-N	Emergency Diesel Generator	105-NC	None	Complete	136.6 m2	Inactive	
100-N	Remote Area Intake	105-ND	Unk	Complete	N/A		
100-N	Fission Products Trap	105-NE	Rad	Complete	N/A	Inactive	
100-N	Basin Recirculating Building	107-N	Rad	Complete	703.2 m2	Inactive	
100-N	Chemical Unloading Facility	108-N	Haz	Complete	74.62 m2	Inactive	
100-N	Heat Exchange Building	109-N	Rad	Complete	7, 386 m2	Inactive	
100-N	Steam and Flow Instrument Building	109-NA	None	Complete	3.72 m2	Inactive	
100-N	Hydro Power Unit (HPU) Building	109-NB	None	Complete	33.8 m2	Inactive	
100-N	Air Sampling Monitor	119-N	Unk	Complete	N/A	Inactive	
100-N	Pumphouse	183-NA	Unk	Complete	TBD	Inactive	
100-N	Clearwell	183-NB	Unk	Complete	N/A	Inactive	
100-N	Filter Backwash Sump	183-NC	Unk	Complete	N/A	Inactive	
100-N	Clearwell Overflow Pond	183-ND	Unk	Complete	N/A	Inactive	
100-N	Fuel/Diesel Oil Day Tanks	184-ND	Unk	Complete	TBD	Inactive	
100-N	Compressor Shed	184-NE	Unk	Complete	N/A	Inactive	
100-N	Chemical Injection House	184-NF	Unk	Complete	TBD	Inactive	
100-N	Emergency Dump Basin	1300-N	Rad	Complete	N/A	Inactive	
100-N	Radioactive Dummy Burial Facility	1303-N	Rad	Complete	N/A	Inactive	
100-N	Sewer Lift Station	1706-NA	Unk	Complete	TBD	Inactive	
100-N	Oil Tanks	1715-N	Unk	Complete	TBD	Inactive	
100-N	Laydown Storage Yard	1723-NX	Unk	Complete	N/A	Inactive	
100-N	Pipe Trestle	1802-NE	Unk	Complete	N/A	Inactive	
100-N	Water Supply Tanks	1900-N	None	Complete	TBD	Inactive	
100-N	Old Septic System	1903-N	Unk	Complete	N/A	Inactive	
100-N	Sewage Lift Station #1	1904-NA	Unk	Complete	N/A	Inactive	
100-N	Sewage Lift Station #2	1904-NB	Unk	Complete	N/A	Inactive	
100-N	Sewage Lift Station #3	1904-NC	Unk	Complete	N/A	Inactive	
100-N	Outfall Structure	1908-N	Unk	Complete	N/A	Inactive	
100-N	Emergency Dump Tank	1304-N	Rad	Complete	400,000 gal	Inactive	

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2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 5 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
100-N	Radioactive Liquid Waste Treatment Facility	1310-N	Rad	Complete	1,000,000 gal	Inactive	
100-N	Liquid Effluent Loadout Station	1312-N	Rad	Complete	12,590 m2	Inactive	
100-N	Change and Control Building	1313-N	Rad	Complete	13.7 m2	Active	Used as a change room
100-N	Liquid Disposal Building	1314-N	Rad	Complete	167.2 m2	Inactive	
100-N	Diversion System Valve House	1315-N	Rad	Complete	12.5 m2	Inactive	
100-N	Valve House	1316-N	Rad	Complete	11.1 m2	Inactive	
100-N	Valve Vault	1316-NA	Rad	Complete	13 m2	Inactive	
100-N	Crib Effluent Iodine Monitoring Facility	1316-NB	Rad	Complete	110.5 m2	Inactive	Magnetic Flowmeter Vault
100-N	Turbine Meter Valve	1316-NC	Rad	Complete	N/A	Inactive	
100-N	Guard Station (see "Other" column)	1112-N	None	Complete	224.9 m2	Active	Shared facility BHI office & WHC Telecommunications HUB
100-N	Badge House (SEA)	1112-NB	None	Complete	7.4 m2	Inactive	
100-N	Training Building	1120-N	None	Complete	1,115 m2	Inactive	
100-N	Carpenter/Paint Shop	1143-N	None	Complete	288 m2	Inactive	
100-N	Air Stack	116-N	Rad	Complete	NA	Inactive	
100-N	Air Filter Building	117-N	Rad	Complete	398 m2		
100-N	Valve Control House	117-NVH	Rad	Complete	7.4 m2	Inactive	
100-N	Air Sampling & Monitoring	119-NA	Unk	Complete	13.7 m2	Inactive	
100-N	Change Room	11-N	None	Complete	74.3 m2	Inactive	
100-N	Waste Treatment Pilot Facility	1322-N	Rad	Complete	60.8 m2	Inactive	
100-N	Effluent Water Pilot Plant	1322-NA	Rad	Complete	144 m2	Inactive	
100-N	Crib Effluent Iodine Monitoring Facility	1322-NB	Rad	Complete	19.9 m2	Inactive	
100-N	Turbine Meter Vault	1322-NC	Unk	Complete	N/A	Inactive	
100-N	Diversion Valve House	1327-N	Rad	Complete	46.5 m2	Inactive	
100-N	Storage Building	13-N	None	Complete	74.3 m2	Inactive	
100-N	230KV Electrical Substation	151-N	Unk	Complete	N/A	Inactive	
100-N	Switch Gear Building	153-N	None	Complete	207.9 m2	Inactive	
100-N	Demineralized Plant	163-N	None	Complete	1,085 m2	Inactive	
100-N	Oil Storage Building	166-N	Haz	Complete	66.3 m2	Inactive	
100-N	Vehicle Inspection Building	1702-N	None	Complete	2.16 m2	Inactive	
100-N	Instrument & Electrical Facility	1705-N	None	Complete	858.4 m2	Inactive	Maintenance Shop

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2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 6 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
100-N	Maintenance Shop Annex	1705-NA	None	Complete	241.46 m2	Inactive	
100-N	Storage Building/Maintenance Shop	1706-N	None	Complete	208.4 m2	Inactive	
100-N	Boat House	1707-N	None	Complete	46.5 m2	Inactive	
100-N	Insulation Shop	1712-N	None	Complete	74.3 m2	Inactive	
100-N	Warehouse & Receiving	1714-N	None	Complete	297.3 m2	Inactive	
100-N	Warehouse	1714-NA	None	Complete	371.6 m2	Inactive	
100-N	Warehouse	1714-NB	None	Complete	89 m2	Inactive	
100-N	Decontamination Shop	1722-N	Rad	Complete	92.7 m2	Inactive	
100-N	Contaminated Equipment Storage Building	1723-N	None	Complete	372 m2	Inactive	
100-N	Gas Bottle Storage	1734-N	None	Complete	47.4 m2	Inactive	
100-N	River Water Pump House	181-N	None	Complete	151.6 m2	Inactive	
100-N	Pumphouse/Guard Tower	181-NA	Unk	Complete	N/A	Inactive	
100-N	#3 Diesel Enclosure	181-NB	Unk	Complete	N/A	Inactive	
100-N	Sample Station/Skid Station	181-NC	None	Complete	N/A	Inactive	
100-N	High Lift Pumphouse	182-N	None	Complete	910 m2	Inactive	
100-N	Water Filter Plant	183-N	None	Complete	558 m2	Inactive	
100-N	Power House	184-N	None	Complete	999.1 m2	Inactive	
100-N	Power House Annex Building	184-NA	None	Complete	418 m2	Inactive	
100-N	Airhandler Main Building	184-NB	None	Complete	86.2 m2	Inactive	
100-N	Airhandler Annex Facility	184-NC	None	Complete	72.8 m2	Inactive	
200-E	207BA Sampling Building	207-BA	Rad	1999	N/A	N/A	
200-E	BCE Neutralization	211-BA	Rad	1999	224.9 m2	N/A	
200-E	BCE Diversion/Pump Station	211-BA-151	Rad	1999	TBD	N/A	
200-E	BCE Sump/Pump Station	211-BA-152	Rad	1999	TBD	N/A	
200-E	Diverter Station	211-BA-153	Rad	1999	TBD	N/A	
200-E	Motor Control Center (MCC) Building	211-BB	None	1999	TBD	N/A	
200-E	Fission Products Loadout Station	212-B	Rad	1999	395 m2	N/A	
200-E	Water Treatment Building	217-B	Rad	1999	TBD	N/A	
200E	Gas Preparation Facility	215-C	Unk	Complete	TBD	N/A	
200-E	Vault, Behind 222B, Inactive	218-E-7	Rad		N/A	N/A	

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2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 7 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-E	Emergency Equipment Storage	218-B	None	1999	N/A	N/A	
200-E	Hazardous Waste Emergency Equipment	219-B	Rad	1999	N/A	N/A	
200-E	Ice House at 227B	2201-B	None	1999	N/A	N/A	
200-E	221-B Plant (WESF)	221-B	Haz	1999	TBD	N/A	
200-E	BCE Neutralization System Building	221-B-40	Rad	1999	TBD	N/A	
200-E	Sewer Monitoring Station	221-BA	Rad	1999	N/A	N/A	
200-E	Process Steam and Condensate B	221-BB	Rad	1999	N/A	N/A	
200-E	SWP Change House	221-BC	Rad	1999	N/A	N/A	
200-E	Laundry Storage Building	221-BD	Rad	1999	N/A	N/A	
200-E	Fork Lift Storage Building	221-BE	Rad	1999	N/A	N/A	
200-E	Condensate Effluent Discharge Facility	221-BF	Rad	1999	TBD	N/A	
200-E	B Plant Cooling Water Sampling	221-BG	Rad	1999	N/A	N/A	
200-E	Canyon Crane Maintenance Facility	221-BH	Rad	1999	N/A	N/A	
200-E	BCP Pump Pit	221-BH-1	Rad	1999	N/A	N/A	
200-E	Process Condensate Facility	221-BJ	Rad	1999	TBD	N/A	
200-E	Paint Shop	2242-B	Haz	1999	N/A	N/A	
200-E	Plutonium Concentration Building	224-B	Rad	Complete	3, 001 m2	Inactive	
200-E	Waste Encapsulation & Storage Facility	225-B	Rad	Unknown	TBD	N/A	
200-E	K1 Filter Pit Encapsulation Facility	225-BA	Rad	Unknown	TBD	N/A	
200-E	K3 Filter Pit Encapsulation Facility	225-BB	Rad	Unknown	TBD	N/A	
200-E	Encapsulation Compressor Facility	225-BC	None	Unknown	TBD	N/A	
200-E	Encapsulation Waste Mon & Sample BI	225-BD	Rad	Unknown	TBD	N/A	
200-E	Encapsulation Repair Shop	225-BE	Rad	Unknown	N/A	N/A	

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Table 2-4. Facility and Infrastructure List. (Page 8 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-E	Hot Yard Shed	2260-B	Rad	Unknown	N/A	N/A	
200-E	Organic Waste Recovery Building	227-B	Haz	Unknown	TBD	N/A	
200-E	DMF Cement Silo	2402-EB	Rad	Unknown	N/A	N/A	
200-E	Newly identified 200 Area Bldgs	241-B-361	Unk	Unknown	5,000 gal	N/A	
200-E	Tank	241-CX-70	Rad	Complete	TBD	Inactive	RCRA permitted TSD
200-E	Tank	241-CX-71	Rad	Complete	TBD	Inactive	RCRA permitted TSD
200-E	Tank & Greenhouse	241-CX-72	Rad	Complete	TBD	Inactive	RCRA permitted TSD
200-E	Instrument Air Compressor Building	241-B-701	None	Unknown	TBD	N/A	
200-E	Waste Metal Recovery Facilities B	241-BR	Rad	Unknown	TBD	N/A	
200-E	Wst Mtl Recovery Facilities, Diver	241-BXR-15	Rad	Unknown	TBD	N/A	
200-E	Control House and Compressor, I	241-BY-254	Rad	Unknown	TBD	N/A	
200-E	Control House in Tank Solidification	241-BY-301	Rad	Unknown	TBD	N/A	
200-E	Compressor House, ITS1	241-BY-302	Rad	Unknown	TBD	N/A	
200-E	242B Evaporator Facility	242-B	Rad	1998	TBD	N/A	
200-E	Cask Loading Building	242-BL	Rad	1998	TBD	N/A	
200-E	Salt Well Receiver Vault	244-BX	Rad	Unknown	N/A	N/A	
200-E	Substation 13.8 kV	252-BY	Rad	Unknown	N/A	N/A	
200-E	Control House	254-BY	Rad	Unknown	N/A	N/A	
200-E	Condensate Neutralization Tank	270-E	Unk	Unknown	TBD	N/A	
200-E	Breathing Air Compressor House	2711-B	None	Unknown	N/A	N/A	
200-E	Electrical Instrumentation Building	2712-B	Rad	Unknown	N/A	N/A	
200-E	Paint Storage Building	2715-B	Haz	Unknown	N/A	N/A	
200-E	Carpenter Storage	2715-EB	None	Unknown	N/A	N/A	
200-E	RM Checkout Station, Near Tunnel	2716-B	Rad	Unknown	N/A	N/A	
200-E	Service and Office Building	271-B	None	1999	TBD	N/A	

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Table 2-4. Facility and Infrastructure List. (Page 9 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-E	Laundry Storage Bldg. North of 2	271BA	Rad	1999	TBD	N/A	
200-E	Rad. Monitoring and Protective C	2724-B	Rad	Unknown	N/A	N/A	
200-E	Rad. Monitoring and Protective C	2724-BY	Rad	Unknown	N/A	N/A	
200-E	Electrical Maintenance Shop Building	272B	None	1999	N/A	N/A	
200-E	276-B Cold Solvent Storage Bldg	276-B	Haz	1999	TBD	N/A	
200-E	Water Pump House South	282-B	None	Unknown	N/A	N/A	
200-E	Water Pump House North	282-BA	None	Unknown	N/A	N/A	
200-E	Water Reservoir Inlet House, Sou	282-EB	None	Unknown	N/A	N/A	
200-E	Power House Filtration Building	284-EB	None	Unknown	N/A	N/A	
200-E	Exhaust Air Control House, Sand	291-B	Rad	1999	N/A	N/A	
200-E	Exhaust Air Sample House	291-BA	Rad	1999	N/A	N/A	
200-E	Exhaust Air Filter Instrument House	291-BB	Rad	1999	N/A	N/A	
200-E	Exhaust Air Filter Cells 1 and 2	291-BC	Rad	1999	N/A	N/A	
200-E	Air Control House	291-BD	Rad	1999	N/A	N/A	
200-E	Stack Exhaust Encapsulation, Str	291-BE	Rad	1999	N/A	N/A	
200-E	Instrument Service Bldg	291-BF	Rad	1999	N/A	N/A	
200-E	Instrument Service Building	291-BH	Rad	1999	N/A	N/A	
200-E	B Plant Filter (B-463)	291-BJ	Rad	1999	N/A	N/A	
200-E	Instrumentation Building	291-BK	None	1999	N/A	N/A	
200-E	292B Stack Monitoring Station	292-B	Rad	1999	N/A	N/A	
200-E	Off-Gas Filter	293-AB	Rad	1999	N/A	N/A	
200-E	Backflow Preventor Building	294-B	None	1999	N/A	N/A	
200-E	Exhaust Stack	295-BA	Rad	1999	N/A	N/A	
200-E	TGE HVAC Exhaust Stack	296-G-1	Rad	Unknown	N/A	N/A	
200-E	Stack MTWF East	296-HN	Rad	Unknown	N/A	N/A	

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Table 2-4. Facility and Infrastructure List. (Page 10 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-E	RMW Storage Facility #12		Rad	Unknown	N/A	N/A	
200-W	Storage Building	212-N	Rad	Complete	554.6 m2	Inactive	
200-W	Storage Building	212-R	Rad	Complete	554.6 m2	Inactive	
200-E	202-A PUREX Processing Building	202-A	Haz	1998	17,548 m2	N/A	Canyon Building
200-E	Acid Pump House	203-A	Haz	1998	76 m2	N/A	
200-E	Acid Storage Vault, U Cell Below	204-A	Haz	1998	130 m2	N/A	
200-E	Silica Gel Facility	205-A	Rad	Complete	10 m2	Inactive	205-A Solvent Handling Facility
200-E	Vacuum Acid Fractionator Building	206-A	Haz	1998	117.5 m2	N/A	
200-E	Chemical Make Up Tank Farm, Pump	211-A	Rad	1998	271 m2	N/A	
200-E	Fission Product Load Out Station	212-A	Rad	1998	35.6 m2	N/A	
200-E	Fission Product Load In Station	213-A	Rad	1998	47.6 m2	N/A	
200-E	PUREX Warehouse	214-A	Rad	1998	93.8 m2	N/A	
200-E	Sodium Hydroxide Tank Farm Instr	215-A	None	1998	13.4 m2	N/A	
200-E	Valve Control Facility	216-A	Rad	1998	N/A	N/A	
200-E	Storage Tunnel #2 Stack	296-A-10	Rad	1998	3.3 m2	N/A	
200-E	292A Off-Gas Stack	296-A-14	Rad	1998	3.3 m2	N/A	
200-E	202A SG Hoods Stack	296-A-2	Rad	1998	3.3 m2	N/A	
200-E	SG Exhaust Stack	296-A-3	Rad	1998	3.3 m2	N/A	
200-E	Lab Hood Exhaust Stack	296-A-5A	Rad	1998	3.3 m2	N/A	
200-E	Lab Hood Exhaust Stack	296-A-5B	Rad	1998	3.3 m2	N/A	
200-E	SG & U Cell Stack	296-A-6	Rad	1998	3.3 m2	N/A	
200-E	Stack, PUREX-W Exhaust	296-A-7	Rad	1998	3.3 m2	N/A	
200-E	P&O and White Room Exhaust Stack	296-A-8	Rad	1998	3.3 m2	N/A	
200-E	202A N&Q Stack	296-A-1	Rad	1998	3.3 m2	N/A	
200-E	Tank Farm Ventilation Building	241-A-431	Unk	Complete	TBD	Inactive	
200-E	Cesium Loadout Facility	241-C-801	Rad	Complete	TBD	Inactive	
200-E	Electrical Switching Station 13.8	252-A	Rad	1998	N/A	N/A	

Unk Unknown
Rad Radiological
Haz Hazardous

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 11 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-E	PUREX Badge House	2701-AB	None	1998	63 m2	N/A	
200-E	PUREX Railroad Cut Change House	2709-A	None	1998	18.6 m2	N/A	
200-E	Air Compressor Building	2711-A	Rad	1998	83.6 m2	N/A	
200-E	Warehouse	2714-U	None	1998	401 m2	N/A	
200-E	PUREX Maintenance Support Facility	271-AB	Rad	1998	557.4 m2	N/A	
200-E	Cold Solvent Storage Building, R	276-A	Haz	1998	N/A	N/A	
200-E	Solvent Handling Facility	276-C	Rad	Complete	N/A	Inactive	
200-E	Backup Generator Facility	281-A	Rad	1998	133.8 m2	N/A	
200-E	202-A Main Exhaust Air Fltr & Stack Plenn	291-A1	None	1998	9.3 m2	N/A	
200-E	Exhaust Air Sampler House	291-AB	Rad	1998	9.3 m2	N/A	
200-E	Exhaust Air Sampler House	291-AC	Rad	1998	27.9 m2	N/A	
200-E	Filter Pit and Stack	291-AD	Rad	1998	17.5 m2	N/A	
200-E	Filter Cell #4	291-AE	Rad	1998	278.7 m2	N/A	
200-E	Sample Station #2	291-AG	Haz	1998	13.4 m2	N/A	
200-E	AOG Sample Station	291-AH	Rad	1998	TBD	N/A	
200-E	Sample Station #3	291-AJ	Rad	1998	13.4 m2	N/A	
200-E	Tunnel Spray Enclosure and Cais	291-AK	Rad	1998	N/A	N/A	
200-E	Exhaust Air Filter Stack Bldg	291-AR	Rad	1998	9.75 m2	N/A	
200-E	Gaseous Effluent Monitoring Building	292-A	Rad	1998	N/A	N/A	
200-E	PR Stack Sample House	292-AA	Rad	1998	27.9 m2	N/A	
200-E	PUREX Gases Effluent Monitoring	292-AB	Rad	1998	55.7 m2	N/A	
200-E	Offgas Treatment Facility	293-A	Rad	1998	175.4 m2	N/A	
200-E	Hydrogen Peroxide Storage	293-AA	Haz	1998	55.7 m2	N/A	
200-E	Offgas Treatment and Monitoring	294-A	Rad	1998	8.9 m2	N/A	
200-E	ASD Sample Station	295-A	Rad	1998	17.8 m2	N/A	
200-E	SCD Sample and Pumpout Station	295-AA	Rad	1998	7.4 m2	N/A	

Unk Unknown
Rad Radiological
Haz Hazardous

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 12 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-E	PDD Sample Station	295-AB	Rad	1998	7.4 m2	N/A	
200-E	CSL Sample Station	295-AC	Rad	1998	13.4 m2	N/A	
200-E	SWL Sample Station	295-AD	Rad	1998	13.4 m2	N/A	
200-E	PDD Monitoring Bldg	295-AE	Rad	1998	27.9 m2	N/A	
200-E	Diversion Basin	216-A-42	Rad	1998	929 m2	N/A	
200-E	Patrol Guard Shack	2701-AC	None	1998	63 m2	N/A	
200-E	Ammonia Off-Gas Sample Station	291-A	Rad	1998	9.3 m2	N/A	
200-E	Process Distillate Discharge Diversion Building	295EA	Unk	1998	TBD	N/A	
200-W	Canyon Building (REDOX)	202-S	Rad/Haz	Complete	TBD	Inactive	
200-W	Water Retention Basin	207-S	Rad	Complete	TBD	Inactive	backfilled with soil
200-W	Bulk Storage Aqueous Chemical Make-up Tank	211-S	Unk	Complete	TBD	Inactive	
200-W	Plutonium Concentration Facility	233-S	Rad	Complete	195 m2	Inactive	
200-W	Exhaust Air Filter Building	233-SA	Rad	Complete	59.9 m2	Inactive	
200-W	Waste Disposal Condenser House, North	241-SX-401	Rad	Complete	70 m2	Inactive	Condenser Load-out Facility N
200-W	Waste Disposal Condenser House, South	241-SX-402	Rad	Complete	70 m2	Inactive	
200-W	Solvent Handling Facility	276-S	Rad	Complete	TBD	Inactive	
200-W	Hexone Storage Tank	276-S-141	Rad/Haz	Complete	TBD	Inactive	RCRA permitted TSD
200-W	Hexone Storage Tank	276-S-142	Rad/Haz	Complete	TBD	Inactive	RCRA permitted TSD
200-W	Storage Building	2706-S	None	Complete	TBD	N/A	
200-W	Inert Gas Preparation Building	2710-S	None	Complete	TBD	N/A	
200-W	Stack Gas Monitoring Station	2711-S	Rad	Complete	16.3 m2	Inactive	
200-W	Oil Storage Building	2715-S	Haz	Complete		N/A	
200-W	Sand Filter Sampler Mntg Station	2718-S	Rad	Complete	16.3 m2	Inactive	
200-W	Cooling Water Sampling Bldg	2904-SA	Rad	Complete	5.8 m2	Inactive	
200-W	Stack	291-S-1	Rad	Complete		Inactive	
200-W	Exhaust Fan House & Control Stack	291-S	Rad	Complete	61 m High	Active	
200-W	Valve Pit House	292-S	Rad	Complete	23 m2	Inactive	

Unk Unknown
Rad Radiological
Haz Hazardous

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 13 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-W	Offgas Treatment Facility	293-S	Rad	Complete	82 m2	Inactive	
200-W	Stack	296-S-1	Rad	Complete	N/A	Inactive	
200-W	Stack	296-S-2	None	Complete	N/A	Inactive	
200-W	Stack	296-S-4	None	Complete	N/A	Inactive	
200-W	Stack	296-S-6	None	Complete	N/A	Inactive	
200-W	East Stack	296-S-7	None	Complete	N/A	Inactive	
200-W	West Stack	296-S-7	None	Complete	N/A	Inactive	
200-W	Stacks	296-S-12	Unk	Complete	N/A	Inactive	
200-W	Uranium Storage Tank Enclosure	203-U	None	Complete	TBD	Inactive	
200-W	Concentrated Uranium Storage Tank Enclosure	203-UX	None	Complete	TBD	Inactive	
200-W	Sample Shack	207-U	Unk	Complete	N/A	Inactive	
200-W	Tank Farm	211-UA	Unk	Complete	TBD	Inactive	
200-W	Bulk Storage Aqueous Chemical Make-up Tanks	211-U	Unk	Complete	TBD	Inactive	
200-W	Canyon Building (U Plant)	221-U	Rad	Complete	7, 757 m2	Inactive	
200-W	UO3 Plant Concentration Facility	224-U	Rad	Complete	TBD	Inactive	
200-W	UO3 Calcination & Loadout Building	224-UA	Rad	Complete	TBD	Inactive	
200-W	Vault Thorium Storage, U Area Div	241-WR	Rad	Complete	1, 334.6 m2	Inactive	
200-W	Oil Storage Shed	2715-U	Haz	Complete	N/A	Inactive	
200-W	Maintenance Shop/Storage	2715-UA	Haz	Complete	N/A	Inactive	
200-W	Fire Protection Shed	2716-U	Unk	Complete	N/A	Inactive	
200-W	Office Building	271-U	Haz	Complete	2, 852 m2	Active	
200-W	Solvent Recovery	276-U	Rad	Complete	61 m High	Inactive	
200-W	Stack	291-U-1	Rad	Complete	N/A	Inactive	
200-W	Exhst Fan Cont Hse, Sand Fltr, & Vessel Vent Pit	291-U	Rad	Complete	N/A	Inactive	
200-W	Stack Monitoring Station	292-U	Rad	Complete	N/A	Inactive	
200-W	Stack	296-U-10	Rad	Complete	N/A	Inactive	
200-W	Waste Incinerator Facility	232-Z	Rad	Complete	194 m2	Inactive	

Unk Unknown
Rad Radiological
Haz Hazardous

2.0 INSTALLATION DESCRIPTION AND COMPREHENSIVE PLANNING

Table 2-4. Facility and Infrastructure List. (Page 14 of 14)

Area	Name	Facility Number	Condition (Contamination)	Transition Schedule	Size	Status	Other
200-W	Concentrated Uranium Storage Tank Enclosure	203-UX	Unk	Complete	TBD	Inactive	
200-W	Retention Basin	207-U	Unk	Complete	N/A	Inactive	
300	Fuels Development Laboratory	308	Rad	1996	TBD	N/A	
300	Fuel Supply System	313N	Unk	Unknown	TBD	N/A	
300	Fuel Supply System	313S	Unk	1998	TBD	N/A	
300	Fuel Supply System	303F	Unk	1998	TBD	N/A	
300	Fuel Supply System	303K	Unk	1998	TBD	N/A	
300	Fuel Supply System	303A	Unk	2001	TBD	N/A	
300	Fuel Supply System	303B	Unk	2001	TBD	N/A	
300	Fuel Supply System	303G	Unk	2001	TBD	N/A	
300	Fuel Supply System	303M	Unk	1998	TBD	N/A	
300	Fuel Supply System	333	Unk	2001	TBD	N/A	
300	Fuel Supply System	334	Unk	1998	TBD	N/A	
300	Fuel Supply System	334Tank Fm	Unk	1998	TBD	N/A	
300	Fuel Supply System	304	Unk	1998	TBD	N/A	
300	Fuel Supply System	334A	Unk	1998	TBD	N/A	
300	Fuel Supply System	3707G	Unk	1999	TBD	N/A	
300	Fuel Supply System	3716	Unk	2001	TBD	N/A	
300	Fuel Supply System	3712	Unk	2001	TBD	N/A	
300	SP-100 GES Test Facility	309	Rad	1998	TBD	N/A	

Unk Unknown
 Rad Radiological
 Haz Hazardous

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

This section summarizes the status of Hanford Site remediation activities, and describes how RL is managing for success across the whole spectrum of Hanford Site remediation activities.

The Richland ER Project has made significant progress in remediating the Hanford Site. The rate of progress is accelerating, visible, and strongly supported by regulators, tribal entities, and other Hanford Site stakeholders. The Richland ER Project is significantly reducing risks to people (and the environment) through aggressive removal and disposal of the highest priority legacy waste along the Columbia River. Momentum is building toward faster elimination of the greatest hazards and increased value per budget dollar in making the Columbia River and adjacent Hanford Site lands suitable for alternative public and industrial uses.

3.1 CURRENT ENVIRONMENTAL RESTORATION ACTIVITIES

Results of Remediation Activities

The overall DOE contract reform initiative to improve ER performance at the Hanford Site by changing from a Management and Operations (M&O) contract approach to a performance-based ER contract is a demonstrated success. Projectizing the contractor's work, and reorganizing RL to a project management orientation, is the primary change that has improved ER performance. The cost to taxpayers is being steadily reduced, while remediation programs are simultaneously accelerating. Key performance improvements include the following:

- 64.9M liters (17.1M gal.) of groundwater have been treated.
- 857.79 hectares (2,118 acres) of surface contamination have been stabilized.
- Over 15,300m³ (20,000 yds³) of contaminated soil have been excavated.
- Six large retention basins were decontaminated and demolished and, in the process, 2.8M kg (6.2M lbs.) of steel were recycled.
- 64,014 kg (141,000 lbs.) of carbon tetrachloride were removed from groundwater.
- 37 facilities were decontaminated and decommissioned.
- Over 44,000 highly radioactive fuel spacers were moved away from the Columbia River.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

- \$225M worth of work scope were performed for \$175M during FY95.
- The Environmental Restoration Disposal Facility (ERDF) was nearly completed.

3.1.1 Project Organization

The Richland ER Project is divided into six subprojects. These include Remedial Action (RA), Groundwater (GW), Environmental Restoration Disposal Facility (ERDF), N-Reactor, D&D, and Program Management and Support (PM&S). This project management approach enables ER activities to be performed consistently throughout the various operable units and geographical locations of the Hanford Site. Specific accomplishments by individual subprojects through FY95, as well as project goals for FY96, are presented in Figures 3-4 through 3-34 (see the end of Section 3.0.).

The scope, objectives, selected accomplishments to date, and FY96 goals for these six subprojects are as follows:

- **Remedial Action**

Remediate the past-practice source operable unit waste sites. This includes disposition of liquid waste disposal sites and certain *Resource Conservation and Recovery Act of 1976* (RCRA) facilities, and the site-wide burial ground remediation approach. The emphasis is on remediating all known source operable unit waste sites to ensure protection of human health and the environment. Figures 3-4 through 3-11 (at the end of this section) present selected RA accomplishments to date, along with FY96 goals.

- **Groundwater**

Contain the spread and reduce the mass of key groundwater contamination plumes that may present a human health or environmental risk at the Columbia River. These actions are implemented according to the *Hanford Past-Practice Strategy*, which provides for performing accelerated Interim Remedial Measures (IRMs) for contaminant plumes. Figures 3-12 through 3-16 (at the end of this section) present selected GW accomplishments to date, along with FY96 goals.

- **Environmental Restoration Disposal Facility**

Provide a facility for receipt and disposal of low-level CERCLA waste, to include radioactive waste, hazardous waste, or a combination thereof that is generated through Hanford Site remediation. The ERDF is designed to provide trench capacity, as needed, to accommodate projected volumes of Hanford Site generated remediation waste over the next 30-40 years. Figures 3-17 through 3-19 (at the end of this section) present selected ERDF accomplishments to date, along with FY96 goals.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

- **N Reactor**

Deactivate N Reactor by removing all unattached materials and equipment (including waste), and by placing facilities in an environmentally safe condition such that minimal surveillance and maintenance will be required. Included is the remediation of contaminated soil and groundwater at N Reactor. In addition, all facilities will be rendered structurally sound for a period that will allow D&D activities to proceed as scheduled. Figures 3-20 through 3-22 (at the end of this section) present selected N Reactor accomplishments to date and FY96 goals.

- **Decontamination and Decommissioning**

Eliminate potential environmental, human health, and safety hazards by maintaining and dispositioning the surplus inactive facilities and waste sites at the Hanford Site. Figures 3-23 through 3-29 (at the end of this section) present selected D&D accomplishments to date and FY96 goals.

- **Program Management and Support**

Provide overall management, cost-control, regulatory, and technical support to the Richland ER Project. Figures 3-30 through 3-32 (at the end of this section) present selected PM&S accomplishments to date and FY96 goals.

Other Selected Improvements

Other selected improvements (and resulting benefits) are presented in Table 3-1. The cost savings associated with the contract reform initiative are discussed in Section 5.6.4.

Table 3-1. ER Project Improvements/Benefits. (Page 1 of 2)

IMPROVEMENTS	BENEFITS
1. Baseline revisions	An estimated \$2B (in current dollars) in overall project costs will be saved as a result of the way characterization and remediation activities are conducted through the life of the project.
2. Met all of the 46 milestones established by the Tri-Party Agreement. (FY95-FY96, 2nd QTR).	Field work is being accomplished on or ahead of schedule.
3. Reorganized ADS 3400, Project Management and Support (PM&S).	Reorganizing ADS-3400 PM&S resulted in a reduction in management costs from \$49 M in FY94 to \$23M in FY96 to a projected cost of \$19M for FY97. These cost reductions allowed the reallocation of funds from management support to field remediation activities.
4. Reduced staffing.	Reduction in staff has led to more efficient distribution of necessary manpower resources and more efficient systems with the appropriate numbers of people accordingly assigned.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Table 3-1. ER Project Improvements/Benefits. (Page 2 of 2)

IMPROVEMENTS	BENEFITS
5. Deleted approximately 50% of redundant or unnecessary engineering procedures (2500 to 1172); streamlined the general engineering criteria to replace DOE Order 6430.1A	More efficient application of engineering procedures/instructions and design criteria, resulting in significant cost savings.
6. Completed cleanup of two major portions of the Hanford Site (Arid Lands Ecology Reserve and North Slope).	More than half of Hanford's land area is now suitable for unrestricted use (290 of 560 mi ²).
7. Completed cleanup of 1 of the 4 <i>National Priority List</i> (NPL) sites (i.e., 1100 Area).	This property, within the Richland City limits, is now available for other uses.
8. Completed restoration of Columbia River islands.	Eliminated risk to environment and intruders on these islands.
9. Nearing completion of the Environmental Restoration Disposal Facility (ERDF). 2.1M yds. ³ have been excavated. The ERDF is a massive facility designed to store contaminated soils. (Applicable ROD issued.)	The ERDF will provide the lowest disposal costs for remediation wastes of any DOE site.
10. Evaluated/demonstrated approximately 30 new technologies.	Increased efficiency in remediation techniques and associated cost saving through use of innovated technologies.
11. Implemented contract reforms to shift emphasis from paper studies to physical cleanup work. Approximately 72% of project funding is currently being expended on field work. (The goal is 90% of expenditures for field work.)	More efficient use of available funding.
12. Of the nine ERAs initiated, six are complete.	Elimination of hazardous constituents; risk reduction to human health and the environment.
13. Aggressive remediation of the 100 Area NPL site is in progress, in accordance with a Record of Decision (ROD) issued in September 1995.	Removal of 15,300 m ³ (20,000 yds. ³) of contaminated soils. This removal volume will increase to 45,900 m ³ (60,000 yds. ³) in FY96 and 191,250 m ³ (250,000 yds. ³) in FY97. This represents a major reduction in the potential for contaminant migration from the 100 Area to the Columbia River.
14. Cleanup of groundwater discharging to the Columbia River from the 100 area NPL site is in progress. There is consensus by stakeholders on a near term strategy, while a long-term strategy is actively being developed.	Continuing reduction of risk to the Columbia River from the 100 Area contaminants allows continued safe recreational use of the Columbia River by the public.
15. Cleanup of the 300 Area is in progress under ERAs. Aggressive remediation of the 300 Area NPL site will begin when a ROD is issued in June 1996.	Elimination of the last source of potential contamination from the 300 Area to the Columbia River.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

3.1.2 Current Richland ER Project Environmental Restoration Release Sites

Table 3-2 presents a summary of the major release sites, in terms of each operable unit. The relative ranking for the sites scheduled for remediation through FY98 is presented in Section 4.0. The location of these release sites is depicted in Figure 3-1.

When the *Tri-Party Agreement* was originally drafted in 1989, the Richland ER Project was divided into 78 operable units. As streamlining efforts have been developed by the ER Project, and approved by the regulators, subsequent amendments to the *Tri-Party Agreement* have reduced that number to 72 operable units (62 source and 10 groundwater units). The operable units are located primarily within the operational areas discussed in Section 2.3, and they are presented in Figure 3-1. They include the following:

- Over 1,400 sites containing facilities, waste areas, and unplanned release sites.
- 625,000 m³ (817,000 yds³) of solid waste containing 4.8 million curies of radioactive material.
- Nine reactors and one major fuel processing plant (over 100,000 metric tons of uranium fuel were irradiated and processed at these locations).
- Approximately 40.2 km (25 miles) of the Columbia River, including its shoreline and islands.
- Over 600 cribs, trenches, ponds, ditches, and drains that received 1.7 trillion liters (450 billion gallons) of liquid waste containing radioactive (approximate 678,000 curies) and hazardous chemical materials.
- 10 groundwater operable units contaminated with radioactive and/or hazardous chemical materials above DWS (220 km² [85 miles²]).

3.1.3 Environmental Condition of Property

Figure 3-1 presents the various levels of surface contamination of the property being remediated by the ER Project. Figures 3-2 and 3-3 illustrate the location of principal contaminants that have been identified in the vadose zone (the soil layer above the water table). Some of these contaminants remain fixed in the vadose zone, while other contaminants, of a mobile nature, have migrated to the water table and have contaminated the groundwater above DWS (see Section 2.0, Figures 2-3 and 2-4). These figures provide specific information derived from process knowledge, historical data, and characterization/remediation efforts that have been completed to date.

April 3, 1996

3-6

Table 3-2. Release Site Summary Table. (Page 1 of 2)

Activity Name Description ¹	ADS No.	Risk Data Sheet	Hazards and Contaminants	Acres and Volumes	Phase	Relative Ranking	Cleanup Actions Completed
RARA/USTS	3500 PT	R95B0002	Chromium, strontium, nickel, carbon-14, cobalt, europium, tritium, thorium, arsenic, cadmium, lead, nitrate, and mercury	393 sites and 10 km ² (2,500 acres)	Waste Management	Medium to High ³	2,100 acres have been stabilized.
100-DR Aggregate Area RA (2)	3100 PA	R96N0076	Chromium, strontium, nickel, carbon-14, cobalt, europium, tritium, plutonium, radium, thorium, arsenic, cadmium, lead, nitrate, and mercury	581,000 LCM* (759,000 LCY*)	DR-1 = Record of Decision, Remedial Design ²	Medium to High ³	Soil Wash Treatability Test
100-BC Aggregate Area RA (5)	3100 PB	R96N0077	Americium, pentachlorophenol, chromium, strontium, nickel, carbon-14, cobalt, europium, tritium, plutonium, radium, thorium, arsenic, cadmium, lead, nitrate, and mercury	429,000 LCM (561,000 LCY)	BC-1 = Record of Decision, Remedial Design ²	Medium to High ³	118-B-1 Burial Ground Treatability Test 116-B-4 French Drain 116-B-5 Crib 100-IU-1 Riverland Rail Yard 116-C-1 In Progress 100-IU-3 North Slope (37 sites)
100-KR Aggregate Area RA (4)	3100 PC	R96N0078	Chromium, cesium, carbon-14, cobalt, europium, plutonium, strontium, potassium, thorium, uranium, nitrate, tritium, and mercury	489,000 LCM (639,000 LCY)	RR-1 = Proposed Plan ²	Medium to High ³	
100-FR Aggregate Area RA (3)	3100 PD	R96N0079	Chromium, cesium, carbon-14, cobalt, europium, barium, plutonium, potassium, thorium, arsenic, cadmium, lead, strontium, nitrate, trichlorethylene, and mercury	729,000 LCM (1,036,000 LCY)	FR-1 = Proposed Plan ²	Medium to High ³	116-F-4 (Treatability Test)
100-HR Aggregate Area RA (5)	3100 PE	R96N0080	Chromium, cesium, cobalt, europium, barium, plutonium, strontium, potassium, arsenic, cadmium, lead, chrysene, nitrate, and mercury	333,000 LCM (436,000 LCY)	HR-1 = Record of Decision, Remedial Design ²	Medium to High ³	100-IU-4 Sodium Dichromate Drums 100-IU-5 Pickling Acid Crib
100-NR Aggregate Area RA (3)	3125 PG	R96N0081	Strontium, cobalt, chromium, cesium, carbon-14, cobalt, europium, plutonium, potassium, thorium, arsenic, uranium, ruthenium, manganese, cerium, lead, zinc, tritium, diesel, and mercury	468,000 LCM (612,000 LCY)	ERA Implementation CMS	Medium to High ³	
200-BP Aggregate Area RA (11)	3200 PL	R96N0087	Strontium, tritium, nitrate, cesium, technetium, uranium, and plutonium	1,001,000 m ³ (10,769,000 ft ³)	RI/FS	Medium to High ³	Constructed the Hanford Prototype Barrier over one crib in the 200-BP-1 OU
200-NO Aggregate Area RA (1)	3200 PM	--	Strontium, tritium, cobalt, cesium, cyanide, technetium, uranium, nitrate, and plutonium	196,000 m ³ (2,109,000 ft ³)	RI/FS	Medium to High ³	

¹ - () Number of Operable Units (OU) in Aggregate Area

² - Remaining OUs are in RI/FS phase

³ - High Relative ranking for D&D operation only

*LCM = Loose Cubic Meters

*LCY = Loose Cubic Yards

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Table 3-2. Release Site Summary Table. (Page 2 of 2)

Activity Name Description ¹	ADS No.	Risk Data Sheet	Hazards and Contaminants	Acres and Volumes	Phase	Relative Ranking	Cleanup Actions Completed
200-PO Operable Unit RA (6)	3200 PN	R96N0138	Strontium, tritium, nitrate, cesium, technetium, uranium, and plutonium	921,000 m ³ (9,916,000 ft ³)	RI/FS	Medium to High ³	
200-RO Operable Unit RA (4)	3200 PP	--	Tritium, nitrate, strontium, trichloroethylene, and carbon tetrachloride	492,000 m ³ (5,297,000 ft ³)	RI/FS	Medium to High ³	
200-SO Operable Unit RA (1)	3200 PR	--	Cesium, strontium, plutonium, and nitrate	10,000 m ³ (108,000 ft ³)	RI/FS	Medium to High ³	
200-TP Operable unit RA (6)	3200 PS	--	Tritium, nitrates, strontium, cesium, trichloroethylene, and carbon tetrachloride	455,000 m ³ (4,901,000 ft ³)	RI/FS	Medium to High ³	
200-UP Operable Unit RA (3)	3200 PT	--	Carbon tetrachloride, trichloroethylene, nitrate, plutonium, and chloroform	212,000 m ³ (2,285,000 ft ³)	RI/FS	Medium to High ³	
200-ZP Operable Unit RA (3)	3200 PU	R96N0088	Carbon tetrachloride, trichloroethane, nitrate, plutonium, and chloroform	1,570,000 m ³ (16,901,000 ft ³)	ZP-1 = ROD ²	Medium to High ³	
200-IU Operable Unit RA (6)	3200 PY	--	Strontium, tritium, nitrate, cesium, technetium, and asbestos	750,000 m ³ (8,076,000 ft ³)	RI/FS	Medium to High ³	
200-SS Operable Unit RA (2)	3200 PW	--	Strontium, tritium, nitrate, cesium, technetium, and asbestos	153,000 m ³ (1,644,000 ft ³)	RI/FS	Medium to High ³	
300-FF Operable Unit RA (4)	3300 P2	R96N0082	Uranium, nickel, trichloroethylene, and, 1,2-dichloroethelene	612,000 LCM* (801,000 LCY*)	FF-1 = Proposed Plan ²	High ³	ERA 316-5 ERA 618-9 Burial Ground
1100-EM Operable Unit RA (3)	3390 P3	--	Trichloroethylene, nitrates, PCB's, BIIEP	N/A	Record of Decision, Remedial Action	N/A	Remedial Actions completed including ALE

- 1 - () Number of Operable Units (OU) in Aggregate Area
 2 - Remaining OUs are in RI/FS phase
 3 - High Relative ranking for D&D operation only

*LCM = Loose Cubic Meters
 *LCY = Loose Cubic Yards

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-1. Contaminated Release Sites.

NOTE: Petroleum Products Stored in 100/200/1100 Areas

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-2. 100 Area/300 Area – Principal Contaminants of Concern.

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3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-3. 200 Areas – Principal Contaminants of Concern.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

3.2 REGULATORY AGREEMENTS, PERMITS, AND CONSENT DECREES

Investigations conducted at the Hanford Site in the 1980s identified numerous waste sites containing radioactive and chemical constituents. The EPA placed four areas of the Hanford Site on the NPL in 1989, and entered into the *Tri-Party Agreement* with DOE in that year. The *Tri-Party Agreement* establishes schedules for achieving compliance with requirements for hazardous and mixed waste management, and provides the framework for cleanup of the Hanford Site over the next 30 years.

Table 3-3 lists *Tri-Party Agreement* and other major regulatory agreements, permits, and consent orders that are in effect at the Hanford Site.

Table 3-3. Major Regulatory Agreements, Permits, and Consent Orders at the Hanford Site.

Date	Subject	Agency
5/15/89	Hanford Federal Facility Agreement and Consent Order	Ecology, EPA, DOE
12/23/91	Consent Order No. 91NM-177 Regarding Liquid Effluent Discharges	Ecology
2/7/94	Federal Facility Compliance Agreement for NESHAPS	EPA
9/28/94	Hanford Site RCRA Permit	Ecology
12/7/81	NPDES Permit	EPA
8/15/93	Radioactive Air Emissions Registration	DOH
TBD	Air Operating Permit (Application Pending)	Ecology

To ensure that the Richland ER Project keeps up with changes to environmental regulations and DOE orders, the ER Program has developed and implemented a system to identify, track, and evaluate new regulatory developments. This system consists of the following major activities:

- Monitoring state and federal registers to identify regulatory developments
- Tracking and documenting regulations selected for analysis
- Commenting on proposed regulations and DOE orders
- Communicating new requirements to project personnel
- Maintaining a project-wide environmental requirements manual.

This system utilizes various subject matter experts to identify applicable environmental regulatory changes, provide timely comments on proposed rules and draft DOE orders, communicate final regulatory requirements to affected personnel for compliance, and maintain

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

the environmental requirements manual.

3.3 CURRENT WASTE MANAGEMENT AND MATERIAL DISPOSITION ACTIVITIES

The Richland ER Project has made substantial progress towards identification of major provisions to reduce waste management costs for ER Projects at the Hanford Site. Significant innovations have resulted in the areas of waste minimization, volume reduction, waste analysis and designation, and disposal.

The construction and operation of the ERDF will greatly enhance waste management capabilities at the Hanford Site. The projected operation of the ERDF is scheduled to begin in the fourth quarter of FY96 for waste materials generated from CERCLA activities. ERDF is also the planned disposal site for waste materials generated as a part of D&D operations.

Prior to the opening of ERDF, waste generated from D&D is either being stored (pending eventual disposal at ERDF), disposed at the Hanford Site low-level waste disposal facility, or shipped off-site. The waste generated from activities other than CERCLA will be disposed at other locations. However, the generation of this waste is a small fraction of the volume expected from overall ER activities.

To account for the potential wide variability in estimates of waste volumes, the planning for ERDF was based on a multi-cell concept. The overall ERDF layout has been established based on a total volume of excavation waste of 21.4 million m³ (27.9 million yd³). The current ERDF ROD authorizes construction of the first two disposal cells, which have a total capacity of 6.3 million m³ (8.2 million yd³). Current projections for excavated waste volumes are approximately 918,000 m³ (1.2 million yd³), with approximately 497,000 m³ (650,000 yd³) to be excavated in the next five years, 271,000 m³ (354,000 yd³) of which will be excavated by the end of 1997.

Remediation in the 200 Area assumes leaving waste in place, since the central plateau is already considered to be an area for long-term waste management. The total area of contaminated sites in the 200 Area is estimated at 5.98 km² (2.3 miles²). The Richland ER Project is currently evaluating the use of caps and barriers to isolate the contaminated waste being left in place. The Hanford Prototype Barrier is currently being tested at the central plateau. The effective size of the cover is approximately 2,336 m² (2,794 yd²).

The Richland ER Project employs recyclable granulated activated carbon (GAC) containers for removal of carbon tetrachloride from groundwater and soils. The GAC containers are thermally regenerated by an off-site contractor. Additional savings are accomplished by negotiating with the regulators for the transfer of waste between operable units to incorporate the waste into treatment processes. Additional options are being evaluated for further reduction in regeneration costs.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Other waste minimization processes include recycling of office paper wastes; decontamination of drilling and well pipes; diversion of segregated waste to clean landfills; salvage of steel from D&D operations; pulverization of salvaged concrete for use in roadways; and reuse of facility deactivation hazardous materials, supplies, and equipment. Consolidation techniques have been developed to minimize the volume of waste loaded into burial boxes.

In addition, the Richland ER Project has successfully demonstrated a process to thermally fuse and convert asbestos waste to nonhazardous materials. This process is currently in use.

Regulators have participated with the Richland ER Project in the data quality objectives (DQO) planning process for remediation, sampling, and analysis. Along with changes in scope definition and waste management, this has resulted in significant reductions in cost and scope, and in the acceleration of schedules. In the 100 Area alone, the costs for remediation of the first 37 sites included in the 100 Area ROD decreased from \$276 million to \$64 million. The analytical portion of this work was reduced from \$109 million to \$14 million (in current dollars).

Past practices are being evaluated to improve the compliance and cost effectiveness of waste management practices. RL is initiating an increased emphasis on waste management and environmental compliance at the individual facility and activity level. This increased emphasis on waste management at the project and activity level is intended to minimize waste generation. The Richland ER Project is incorporating waste disposition considerations into cost planning. This encourages individual manager responsibility and accountability for the generation, management, and disposition of wastes from ER activities.

Regulators have approved an innovative strategy to use ERDF runoff and run-on rainwater, and leachate, for dust suppression. This may eliminate the need to build and operate a water treatment unit. This approach was developed and negotiated based on a study of the water balance of the site. As a backup system, a passive solar evaporation tank will be procured as an economical, waste-minimization treatment.

3.4 PROJECT SUPPORT

3.4.1 Public Participation

Public participation in the environmental restoration process aids significantly in Hanford Site planning activities. In November 1992, the Assistant Secretary, Environmental Restoration and Waste Management (ERWM), adopted a public participation policy (as required by law). Since that time RL has developed a public participation policy for the Hanford Site, providing the tribal entities, regulators, stakeholders, and the public with opportunities to be involved in the Hanford Site decision-making process.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

The objectives of the public participation process are as follows:

- Provide complete and timely information so that the public can understand the challenges and issues facing the Hanford Site.
- Identify the roles of regulators and stakeholders in the decision-making process.
- Provide a wide range of opportunities for stakeholders and the public for meaningful involvement in the decision-making process.
- Provide regulators, stakeholders, and the public with timely responses as to how and why their input was/was not incorporated in decisions.
- Fulfill both the letter and the spirit of legal, regulatory, and policy requirements relating to Hanford Site public involvement.

In the past few years several significant activities have occurred at the Hanford Site that reflect its commitment to providing meaningful opportunities for public involvement. These activities include the establishment of the FSUWG and the Tank Waste Task Force (TWTF). In December 1993, the HAB was established as a standing, site-specific advisory board to address Hanford Site cleanup issues. The HAB has approximately 32 members who represent diverse Hanford Site cleanup interests. The HAB's primary responsibility is to provide informed recommendations and advice to RL, EPA, and the Department of Ecology.

3.4.2 Program Management

RL is responsible for general program management of the ER Project, and for providing the support necessary to (1) establish and maintain systems to ensure the quality and timeliness of activities and deliverables; (2) implement management systems; (3) interact with the public; (4) promote an injury-free workplace; (5) ensure compliance with applicable laws and regulations; and (6) control project costs and schedules in accordance with RL policy and requirements. The costs for Program Management and Support include all federal salaries, benefits, office supplies, and travel. In addition, costs associated with general services support contractors are included in Program Management and Support.

One of the substantial successes of the Richland ER Project has been an estimated \$2 billion reduction (in current dollars) in the estimated life-cycle cost of the ER program. This substantial reduction is the result of significant changes in the way in which characterization and remediation activities are conducted. The major changes to the estimate reflect lower volumes of soil to be excavated in the 100 and 300 Areas, and a significant reduction in the number of soil samples sent from the excavation site to analytical laboratories.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Several other items contribute to the reduced estimate. Engineering studies and regulatory negotiations completed in 1995 suggest that a removable vertical barrier planned for the 100-N Area will not be required, thereby eliminating more than \$45 million (in current dollars) from the estimate. Technical re-evaluations of caps and engineered barriers have resulted in a lower estimated cost per square meter of cap or barrier installed. Finally, the ERDF will become operational earlier than previously expected. This will reduce FY96 and FY97 disposal charges that were previously included in the estimate (in current dollars).

3.4.3 Landlord Functions, Support Programs, and Site-Wide Services

The RL landlord program is outside the scope of the Richland ER Project. Its mission is to maintain, preserve, or upgrade the strategic assets of the Hanford Site to meet the total site cleanup mission. The site's assets include the facilities, systems, and equipment that, by design or use, are not essentially dedicated to a single program mission. Hanford Site facilities include laboratories, office buildings, shops, warehouses, and general work space. All electrical systems, sewers, railroads, telecommunications, roads, water systems, and steam supply and distribution systems are the responsibility of the landlord program.

The Richland ER Project depends on the landlord program to maintain the Hanford Site infrastructure. The Richland ER Project can be significantly impacted if critical elements of the site infrastructure supporting the Richland ER Project are not maintained.

3.4.4 Technology Application

DOE has identified the implementation of new technologies as an important part of the Richland ER Project. The impact of escalating costs, combined with limited budgets, is an additional driver towards implementing innovative technologies that will provide more cleanup options for less money. Recognizing this need, RL has established the Technology Application Function, which will support the Richland ER Project in identification, screening, and evaluation of innovative technologies and the Hanford Site Technology Coordination Group (STCG). RL also utilizes Pacific Northwest National Laboratory (PNNL) to support this effort. The purpose of the STCG is to incorporate the legal, technical, economical, environmental, and social factors of the various stakeholders in technology applications.

Strategic issues have been identified, and strategic objectives have been developed. The objectives include the following:

- Identify innovative technologies that improve on the baseline.
- Identify technologies being applied in industry for potential incorporation into environmental restoration projects.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

- Seek emerging technologies for application to the environmental mission.
- Communicate activities and accomplishments.
- Introduce innovative concepts through seminars and technology exchanges.

Specific achievements accomplished under the EM-40 technology program are presented in Figure 3-33 (at the end of this section). EM-40 activities have also been closely integrated with the ongoing technology development efforts of EM-50. These integrated efforts have resulted in field demonstration of EM-50 activities at the release sites. Brief descriptions of environmental restoration technologies that have been demonstrated at the Hanford Site over the past several years, in association with the EM-50 funded program, are presented in Figure 3-34 (at the end of this section).

3.4.5 Department Orders

The Richland ER Project is committed to following the CERCLA process, as prescribed by law. However, while working within that process, the Richland ER Project is also committed to finding more efficient ways of doing business. Many of DOE's requirements for facilities have been self-imposed by DOE orders. A proposal is presently in place to reduce repetitive requirements within the regulatory framework by identifying DOE orders that may duplicate existing regulations. The CERCLA/*Tri-Party Agreement* process will be used to fulfill all substantive requirements that would otherwise be met under the purview of DOE orders. It is anticipated that this streamlining could lead to significant cost savings over the life of the Richland ER Project.

3.4.6 Activities Governed by Other Entities

The Hanford Site has activities that are influenced by Defense Nuclear Facilities Safety Board recommendations. However, as of this date, those activities have been outside the scope of the Richland ER Project. The Defense Nuclear Facility Safety Board (DNFSB) has indicated an interest in remediation activities at the Hanford Site, but thus far the DNFSB has not issued any recommendations that would directly affect the ER programs. Discussions have been held to determine the extent to which DOE nuclear facility and worker safety requirements are satisfied through implementation of CERCLA and the *Tri-Party Agreement*, and whether there are any additional requirements that may be necessary to ensure protection of the public and workers during environmental restoration activities. As a result of these discussions, it has been suggested that a pilot project involving DOE-EM, DOE-EH, and DOE-RL be initiated within the ER program. This may result in a set of policies, procedures, or other documents endorsed by members of the site-wide team for selected Hanford ER facilities and activities.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

A RCRA Part B permit also exists for TSD units at the site. Some of these TSD units are co-located with CERCLA operable units. Efforts are routinely made to coordinate regulatory decisions that impact both the EM-40 and EM-30 projects, so that remedial actions can be accomplished in a unified and cost-efficient manner.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-4. Remedial Actions Typical Activity – 100-BC-1 Crib Demolition.

100-BC-1 Crib Demolition

Excavation

E9510052.6

Ready for Closure

Demolition

History

- The 116-B-5 Crib received 10 million liters of low level effluent from contaminated maintenance shop and decontamination pad in 108-B building including tritium waste. The effluent was disposed to soil

Remediation

- Excavation during FY 1995 removed 400 Lcy non-contaminated and 0 Lcy contaminated soil

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-5. Remedial Action Subproject Accomplishments – 100 Area.

100-KR-1

- M-15-10C
 - Submitted FFS and IRM Proposed Plan

100-KR-2

- M-15-33A
 - Submitted Combined LFI/QRA and FFS
- M-13-00I
 - Completed RI/FS Work Plan
- Initiated IRM Proposed Plan

IU-3 (North Slope)

- Submitted Proposed Plan

100-IU-1 (Riverlands)

- Submitted Proposed Plan

100-B/C Area

118 B-1 Burial Ground Excavation Treatability Study

- M-15-16C
 - Submitted Field Work Report
- #### BC-1 Demonstration Project ERA (Pilot Project)
- Objectives formulated using SAFER
 - Initiated ERA
 - Began remediation 6/4/95
 - Excavated 3,800 yd³ of contaminated soil

BC-1, DR-1, HR-1

- M-15-08D, 8C
 - Submitted FFS and IRM Proposed Plans
- Signed ROD
- Initiated RD/RA

BC-2

- M-15-16E
 - Submitted FFS
- M-15-16F
 - Submitted IRM Proposed Plan

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-6. Remedial Action Subproject Accomplishments – 100 Area.

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3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-8. Remedial Action Subproject Accomplishments – 300 Area.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-9. Remedial Action Subproject Accomplishments – 1100 Area.

North Slope

- M-16-82
 - Complete Remediation and Draft CERCLA Assessment Report
- Drafted Revegetation Plan

HRL = Horn Rapids Landfill

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-10. Remedial Action Subproject Planned Progress for FY96.

Remedial Action Subproject Planned Progress For FY 96

100 Area

- Excavate, package, and store 13,000 yd³ of soil from 116-C-1 Liquid Effluent Trench and complete the excavation of the 116-B-4 French Drain
- Complete Remedial Action Design for the six sites at 100-BC-1 (116-B-1, 116-B-11, 116-B-13, 116-B-14, 116-C-1 and 116-C-5); two sites at 100-DR-1 (116-D-1A and 116-D-1B); and one site at 100-HR-1 (116-H-1) and 100-D Area effluent pipelines
- Initiate remedial actions for 100 BC-1, HR-1, DR-1 ROD
- Prepare and submit Remedial Design Report for 100 BC-1, HR-1, DR-1 ROD
- Prepare and submit Remedial Action Work Plan for 100 BC-1, HR-1 & DR-1 ROD
- A Remedial Action Subcontract will be awarded for initial work in 100-BC-1

100-DR-1

- Remedial Design - includes remedial design up to procurement of a remedial action subcontractor for Group 2 high priority liquid waste disposal sites

100-IU-1, 3, 4 & 5

- Receive approval of a "no further action" Record of Decision

100-IU-2 and 100-IU-6

- Prepare a Focus Package outlining a process for a Streamlined Focus Feasibility Study and Proposed Plan

100 Area NPL Common

- Prepare a Focus Feasibility Study and Proposed Plan (or ESD) for the 100 Area high and low-priority waste sites that are not already in the Initial ROD for 100 Area source operable units
- Burial Ground Strategy - a strategy for alternative approaches addressing burial grounds

200 Area

BP-11

- Resolve comments with Regulators and Public on RI Work Plan

BP-2

- Continues Barrier monitoring of Issues final report

300 Area

300-FF-1 & FF-5

- Resolve comments with Regulators and the public on the combined proposed plan
- Support Regulator preparation for RODs for both 300-FF-1 and 300-FF-5
- A Remedial Design subcontract will be awarded and Remedial Design will be completed for the 618-4 burial ground and the liquid and landfill waste management units
- Prepare construction bid packages, award a Remedial Action subcontract and initiate Remedial Action for the liquid and landfill waste management units
- Continue periodic radiation surveys of the waste sites in the operable units to assure that contamination does not spread
- Complete and issue the Operating and Maintenance (O&M) Plan
- O&M activities will be implemented per long-term surveillance and maintenance

300-FF-2

- Issue draft A LFI report to meet TPA milestone M-15-23
 - Complete data analysis for non-intrusive surface investigations

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-11. Remedial Action Subproject Planned Progress for FY96 (cont'd).

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-12. Groundwater Typical Activity – 100-HR-3 Pump and Treat Treatability Test.

100-HR-3 Pump and Treat Treatability Test

Setting of Effluent
Storage Tank

E9510052.42

Installation of
Flow Meters

Statistics

- Treated 6,800,000 Gallons
- Removed 62 Pounds of Chromium

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-13. Groundwater Subproject Accomplishments – 100 Area.

100-KR-4

- Issued FFS to Regulators
- Issued IRM Proposed Plan to Regulators
- Completed two rounds of sampling

100-BC-5

- Completed two rounds of sampling
- **M-15-09C**
- Submitted FFS
- Submitted focus sheet for no Interim Action

100-HR-3

- Treated over 6,800,000 gallons of groundwater and removed 62 pounds of chromium
- Completed two rounds of sampling
- Incorporated Regulators comments into FFS and issued
- Incorporate Regulators comments into IRM Proposed Plan and issued
- Initiated D Pump and Treat for chrome
- Completed preliminary Columbia River substrate pore water investigation at H Area Reactor - comprehensive investigation in progress
- Submitted D Treatability Test Summary Report to RL

100-FR-3

- Completed two rounds of sampling
- Completed LFI addendum for TCE

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-14. Groundwater Subproject Accomplishments – 200 Area.

200-UP-1

- Treated 4 million gallons of groundwater
- Submitted Treatability Test Report
- M-15-17
 - Submitted IRM Proposed Plan for Uranium, Technetium and Nitrate
- Submitted Bionitrification Test Report
- Completed drilling five new IRM wells

200-ZP-1

- 200-ZP-1 IROD was signed by DOE, EPA, and Ecology
- Treated over 4,000,000 gallons of groundwater
- Submitted DNAPL Plan
- Initiated bio-remediation tech demonstration
- Completed drilling three new ZP-1 wells
- Completed DNAPL well installation
- Submitted final 200-ZP-1 Treatability Test Report, DOE/RL-95-30, Rev. 0
- Submitted the final 200-ZP-1 Groundwater Sampling and Analysis Plan/Quality Assurance Plan, BHI-00038, Rev. 2
- Awarded majority of contracts in support of 200-ZP-1 Phase II upgrades

200-ZP-2

- Removed over 56,000 pounds of Carbon Tetrachloride
- Performed tech demonstrations on tunable hybrid plasma and PURUS
- Installed Passive Soil Vapor Extraction System on borehole W18-247

200-BP-5

- Treated over 900,000 gallons of groundwater - Unit 1 (B-5 Reverse Well Plume System)
- Treated over 300,000 gallons of groundwater - Unit 2 (216-BY Cribs Plume System)
- Deleted M-15-21, eliminating the need for a Proposed Plan

200-NPL Common

- M-15-81A
 - Submitted Draft A of "The Analysis of Potential Impacts to the Groundwater Monitoring Networks in the Central Plateau" report, BHI-00393, to RL
- M-15-81B
 - Submitted Draft A of "The Iodine-129 Contamination: Nature, Extent, and Management Options" report, DOE-RL-95-89, to RL

200-PO-1

- Completed DQO process

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-15. Groundwater Subproject Planned Progress for FY96.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-16. Groundwater Subproject Planned Progress for FY96 (cont'd).

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-17. ERDF Construction – Installation of the Liner.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-18. ERDF Subproject Accomplishments.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-19. ERDF Subproject Planned Progress for FY96.

ERDF Planned Progress For FY 96

- Completion of ERDF Construction (July, 1996)
 - Liner and Leachate Collection System
 - Fences, roads, and peripheral support structures
- Award and mobilize commercial subcontractor for facility operations
 - Subcontractor selection
 - Pre-operations procedures and submittals
 - Site mobilization of facilities, equipment and personnel

- Begin transportation and disposal of remediation waste to ERDF (July, 1996)
 - TPA milestone M-70-00 operations by September, 1996
 - Planned 50,000 yd³ in FY 1996
- Provide groundwater monitoring wells for pre-operational sampling
 - Construction of two additional wells down gradient from ERDF
 - Utilize existing wells for remaining requirements

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-20. N Reactor Typical Activity – N Deactivation Fuel Spacer Removal.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-21. N Reactor Subproject Accomplishments.

N Area Project

- Approval of 100-N Pilot Project Management Plan (TPA)
- Approval of N Reactor Deactivation Program Plan

N Basin

- Finalized Environmental Assessment (FONSI issued 5/1/95)
- Completed Readiness Assessments
- Completed installation of Cask Pit Door and Covers
- Developed Waste Minimization Plan
- Completed installation of Water Filtration System
- Completed installation of Canister Crusher
- Removed 682 CF more low dose hardware than the planned 1622 CF (total 2304 CF)

Facility Deactivation

- Completed installation of the new Potable Water Distribution System
- Completed Deactivation of 32 facilities ahead of schedule
- Completed removal of Fuel Spacers from Silo's ahead of schedule (TPA)

100 NR-N Springs

- Completed construction/startup of the N Springs Pump & Treat System
- Initiated 24 hour operations at N Springs Pump & Treat
- Completed mockup operations in support of drilling crib characterization
- Completed test phase for installation of barrier wall
- Completed NR1/NR2 Workplan (TPA Milestone)

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-22. N Reactor Subproject Planned Progress for FY96.

N Reactor Planned Progress For FY 96

N Area Project

- Implement the DOE Voluntary Protection Program (VPP)
- Efficiently drive the Project toward a six month early completion date - 4/1/97

N Basin

- Complete both low and high dose hardware removal
- Initiate and complete the operation of Remotely Operated Sediment Extraction Equipment (ROSEE)
- Confirm sediment removal/disposal method through the Data Quality Objective (DQO) process
- Initiate water removal

Emergency Dump Basin

- Homogenize, sample and analyze sediment
- Remove sparger and sediment and ship for disposal
- Dewater basin
- Stabilize surfaces
- Install protective cover

Facility Deactivation

- Complete turnover/closeout packages for all previously deactivated facilities
- Deactivate 24 facilities (only 11 will remain for deactivation in FY 97)

100 NR-Springs

- Complete crib characterization and issue LFI/QRA report
- Continue 24 hour operations at Pump and Treat
- Issue monitoring program consolidation report
- Issue report on effectiveness of Pump and Treat operations
- Install in situ treatment curtain

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-23. D&D Typical Activity – 190-D Highbay Wall Removal.

190-D Highbay Wall Removal

Demolition

- The 190-D Highbay and Facility was demolished by implosion (see Figure 7-1) on August 17, 1995
- 2,300 tons of structural steel and materials were salvaged

E9508002.3

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-24. D&D Subproject Accomplishments – 100 Area.

Demolition - 190-D Complex & 1724-D

- Completed 190-D Building Complex decon
 - Completed Asbestos removal
 - Completed Sodium Dichromate removal
 - RAD and hazardous waste decon complete
 - Removed Pressurizer from NPR Loop
 - Completed mercury and lead decontamination
 - IV completed
 - Explosive demo completed
 - Salvage completed
 - Initiated decon/demo of below-grade structures

183-H Solar Evap. Basins

- Issued Final Closure Proposal to regulators
- Completed decontamination
- Initiated demolition
- Sampling plan approved by regulators

Risk Assessment/Upgrades

- Completed electrical distribution systems upgrades to 105-H Reactor Building
- Completed 105-D and 105-DR roof replacement
- Awarded contract for roof replacement at 105F and 105H
- Completed requirement of 10 CFR835 for all buildings

Demolition

- Demolished (5) surplus facilities plus 190-D Complex
 - 1101-N
 - 1102-N
 - 1701-FA
 - 1701-DR
 - 1250*

105-C Reactor

- Approved for large scale D&D Interim Safe Storage technology demonstration

190-C Process Water Pump House

- Completed characterization and Project Plan
- Insulation removal completed

183-C Filter Building

- Completed Charact. Report
- Completed revised Project Plan

River Effluent Pipelines

- Completed robotic field sampling of two riverlines

Emergency Dump Tank

- Completed decontamination of the EDT, achieving 97% dose reduction

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-25. D&D Subproject Accomplishments – 100 Area.

Reactor D&D

- Issued 105-B museum feasibility study
- Completed CDR, FDC and PMP to Decommission the Surplus Reactors
- Completed Characterization of 105-C
- Initiated preliminary eng. contract of 105-C interim Safe Storage

Asbestos Abatement

- Submitted Annual Asbestos Report to CAA
- Completed Removal and Encapsulation of 12,800 linear feet of asbestos pipe at 105-DR, 182-N, 108-N, and 163N/183N, 105C and 109N Bldgs. and 22,000 square feet asbestos containing duct insulation at 105C

Surveillance and Maintenance

- All planned surveillances conducted

Asbestos Conversion

- Awarded contract
- Constructed compound and stockpiled 1,100 yds³ of material for conversion

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-26. D&D Subproject Accomplishments – 200 Area.

233-S PU

Concentration Facility

- Received Approval from DOH for the Notice of Construction
- Completed D & D Preparation
- Decon/Stabilized 80% of the 3200 ft² facility
- Completed NDA surveys of process hood & associated process areas

Surveillance and Maintenance

- Awarded contract for remote monitoring equipment and revised surveillance frequencies
- All planned surveillances conducted
- Completed raw and sanitary water isolation at 202S, 221-U, 224B, 224-U buildings
- Upgraded motor control center in 291U
- Upgraded motor control center in 291U Exhaust Fan Control Building

Facility Transition

- Completed End Point criteria development for PUREX plant
- Supported FFTF, Purex and 300 Area End Point Criteria development

UO₃ Plant

- Accepted into Environmental Restoration D&D Project

232-Z Plutonium Inventory Reduction

- Completed Work Plans for Scrubber Cell and Incinerator
- Completed Criticality Safety Analysis and Prepared Specification for 232-Z Cleanup Work
- Inventory reduction work in Scrubber Cell completed
- Asbestos removal from Cyclone Separator was completed
- Completed 90% of inventory reduction in the incinerator (process room)

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-27. D&D Subproject Accomplishments – RARA.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-28. D&D Subproject Planned Progress for FY96.

D&D Planned Progress For FY 96

- Complete 190-C Project Plan and initiate field activities to complete radiological decontamination and final surveys
- Remove sodium dichromate tanks in the 183-C Pump Room and ACM Steam Piping/Lagging and associated components. Complete above grade structural steel demolition
- Decontaminate 189-D tunnel. Complete subgrade demolition and site restoration
- Complete riverline EE/CA for 100-B and 100-D/DR
- Complete 232-Z inventory reduction
- Complete 105-C interim Safe Storage Conceptual design. Select demo technologies
- Initiate negotiations for dispositioning of eight surplus reactors, PUREX and UO_3

- Conduct routine surveillance and maintenance inspections
- Apply fall residual/selective herbicide application to 393 inactive waste sites
- Decontaminate and stabilize 126-F-1 Ash Pit, 218-E-12A Burial Ground, 218-E-7 Vault, and 218-W-8 Vault
- Demolish 183-H Basin interior walls, floors, and complete physical closure activities
- Complete high priority asbestos removal at five sites
- Complete mobilization and initiate operation of the Asbestos Conversion Unit
- Complete 105-F and H roof repairs
- Complete installation of remote monitoring equipment at REDOX and U-Plant
- Initiate long term surveillance and maintenance actions for 300-FF-5, 1100-EM-1, 1100-EM-3 and 1100-IU-1 operable units (ADS 3800)

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-29. D&D Subproject Planned Progress for FY96-RARA.

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-30. Project Management and Support Subproject Accomplishments.

ERC Support

- Completed Activity Data Sheets (ADSs) FY 1996-2001
- Completed RERP Fiscal Year 1996-1998 Work Plan
- Completed Draft "A" of Long Range Plan
- Completed Rev. "A" of Project Plan

Quality Assurance, Safety and Health

- Radiological Protection Plan was approved by HQ
- Issued the Fire Protection Program implementing procedures
- Issued ERC Environmental Safety and Health Program Plan
- Quality Management Plan (QMP) was approved by RL/HQ
- Submitted ERC Voluntary Protection Program (VPP) Application to DOE-RL for approval
- Revised the Quality Program

Environmental Compliance

- Completed 24 Environmental Assessments and 43 Surveillances

Technology Demonstrations and Applications (TDA)

- Continued Field Demonstration of Purus (PADRE) resin bead technology
- In Situ Vitrification spot melt demonstration
- Completed work on the Hanford Barrier Prototype (HBP)
- Demonstrated Asbestos Conversion Unit
- Advanced Characterization Initiative in place
- Completed Chemical decontamination of the 1304-N Emergency Dump Tank

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-31. Project Management and Support Subproject Accomplishments.

Engineering and Technology

- Completed Data Quality Objective Implementation Plan and Procedures
- Completed strategy for restructuring the Hanford Environmental Information System (HEIS)
- Realigned the analytical capabilities to support projects and initiated EAL operations
- Completed field investigation and sampling of pore water in salmon spawning habitat
- Completed annual Hanford Site Waste Management Units Report
- Initiated integration of the Hanford Geographical Information System (HGIS) with Waste Information Data Systems
- Obtained multicontractor agreement on prioritization of Hanford Site permit applications with no impact on ER projects
- Completed construction modification of the RAD screening facilities to support Groundwater
- Obtained ERC/RL certification of RCRA permit modifications for 1301/1325-N cribs
- Issued standard specification for drilling and well installation that resulted in significant cost reduction for drilling
- Awarded 47 Technical Service Agreements for Design Services
- Developed the Systems Engineering Strategic Planning Model

Automation Technology

- Initiated contract development for "paperless office" concept for the ER Project
- Developed internal communications enhancements using Web technology which reduced cost associated with information dissemination

Site-Wide Services

- Completed revision of ERC procedures
- Completed Pre-Existing Conditions Survey Reports and submitted Corrective Action Plans
- Submitted Price Anderson Amendment Act Quality Assurance Implementation Plan
- Completed modification and validation package for the Strategic Planning Model
- Completed draft of Business Plan for Business Management QIT
- Completed pilot closure process for REDOX surveillance

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-32. Project Management and Support Subproject Planned Progress for FY96.

Project Management & Support Planned Progress For FY 96

Technical Services

- Conduct Technology Seminars and Inter-Site Exchanges
- Conduct HGIS/WIDS procedures
- Complete Phase II (working framework) for HEIS Sample and Analytical Data System
- Obtain final accreditation from State of Washington for EAL/Field Screening methods
- Complete HEIS transition from PNL to the ERC

Project Services

- Baseline Update
- Fiscal Year 97-99 Work Plan
- Issue MAP Document

QES&H

- Voluntary Protection Plan Application Acceptance
- Complete 24 Assessments

Program Support & Public Involvement

- Five Year Plan (ADS Update)
- Project Plan/Management Action Plan Update

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-33. EM-40 Funded Technology Program Accomplishments.

Engineering and Technology

- Completed field demonstration of the Purus (PADRE) vapor treatment system
- Completed field demonstration of In Situ Vitrification (ISV) Spot Melt
- Completed annual testing and monitoring on the Hanford Prototype Barrier
- Completed work in preparation for the Corpex chemical decontamination of the 1304 emergency dump tank, including award of the contract
- Awarded a performance based contract for asbestos conversion
- Developed working models of the micro-chemical analyzer and the dual quartz crystal microbalance through contract with Northwest Instrument Systems, Inc.
- Technologies were transferred from Technology Development to the Richland ER Project, contracted Water Development Corp. for ResonantSonic drilling services and Northwest Services, Inc. for Unsaturated Flow Apparatus (UFA) services

3.0 STATUS OF ENVIRONMENTAL RESTORATION ACTIVITIES

Figure 3-34. EM-50 Funded Technology Program Accomplishments.

Engineering and Technology

- *SEAMIST™ is a characterization tool for collection of in situ soil gas samples in a borehole as it is being drilled*
- *The Cone Penetrometer is a subsurface access technology that can be configured for vapor, groundwater, and soils sampling*
- *Gas Membrane Separation is a remediation technology that utilizes the preferential transport of organic vapors through a non-porous gas-separation membrane*
- *Directional Drilling is an access technology for drilling in the ground at a desired orientation*
- *HaloSnif™ is a monitoring technology that employs an atomic emission sensor for real-time measurements of volatile chlorinated compounds*
- *A Bore Sampler is a characterization tool for collection of soil, gas, or groundwater samples at discrete depths during drilling*
- *Cross-Hole Seismic Tomography is a characterization technology for interpreting geologic structures and fluid saturation characteristics*
- *Portable Acoustic Wave Sensor (PAWS) is a monitoring technology that utilizes an acoustic wave propagation to identify and determine the concentration of a molecular species in the substrate*
- *The Arrayed Sampler is a borehole device to collect discrete, time-resolved soil-gas samples on individual multisorbent traps within an array*
- *In-Well Vapor Stripping is a remediation technology for removal of VPCs from groundwater*
- *In-Situ Bioremediation is a remediation technology where native microorganisms are stimulated to accelerate natural destruction of contaminants*
- *Tunable Hybrid Plasma is a remediation technology that combines radio frequency heating with low energy electron beams to destroy volatile organic compounds in the vapor phase*
- *Passive Soil Vapor Extraction is technology to measure moisture flux through the soil surface and through boreholes*
- *Resonant Sonic Drilling is an access technology that utilizes resonant energy waves to advance the drill pipe*
- *Steam Reforming is a remediation technology employing a steam reforming reactor and a moving bed evaporator*
- *Colloidal Borescope is a characterization and monitoring tool that measures groundwater flow rate and direction by tracking the movement of microscopic particles in groundwater*
- *The In Situ Permeable Flow Sensor is characterization and monitoring tool that uses thermal perturbation techniques to measure the fluid flow velocity in permeable materials*
- *Unsaturated Flow Apparatus (UFA) is a characterization technology that determines the transport behavior of aqueous and non-aqueous phase fluids in soils where hydraulic steady-state can be achieved in hours*
- *EMFLUX is a characterization and monitoring tool that passively collects soil-gas*

4.0 SITE RELATIVE RISK

This section summarizes how the Richland ER Project uses a combination of methods for evaluating risk and prioritizing risk reductions to preserve the health and safety of the public and Hanford Site work force, while minimizing environmental impacts. Relative risk summaries for high priority sites, soil waste sites, and facilities are presented.

Reduction of the safety and health risk to humans and the environment is the primary criteria used to prioritize environmental restoration work at the Hanford Site. The Richland ER Project structures its integrated work plan and schedule to maximize the amount of risk reduction that can be achieved with available resources.

Risk (as defined in this document) is the potential for damage or harmful effects to human health or the environment, due to contamination by hazardous waste and the dangers presented by deteriorated buildings and facilities at the Hanford Site. The Richland ER Project is systematically reducing this risk by removing soil and groundwater contamination, and by demolishing or repairing deteriorated structures and facilities. Materials that are being removed are safely disposed at approved sites.

The Richland ER Project has evaluated the risks posed by each contaminated waste site and deteriorated structure to prioritize remediation work and achieve maximum risk reduction benefits. Remediation is being performed as quickly as possible within the constraints of available resources and regulatory approvals.

Three complementary methods are used in the Richland ER program to assess risks. Each method meets the needs of separate approval processes, and each provides risk assessment results in the format required by the party requesting the information. The three risk assessment methods are as follows:

- Evaluating how human health and the environmental risks meet CERCLA and RCRA cleanup requirements, as prescribed by EPA manuals and agreements between RL, EPA, and Ecology. Qualitative Risk Assessments (QRAs) are now performed through a bias-for-action approach to remediate waste sites with minimum evaluation costs.
- Using relative ranking evaluations (RREs) to meet HQ guidelines by combining quantitative assessments of site and facility risk with qualitative factors to evaluate public and worker safety and health.

4.0 SITE RELATIVE RISK

- Using RDSs to meet other HQ guidelines for risk evaluation, including incorporation of mortgage reduction, mission completion, and socioeconomic/cultural values to develop an integrated priority list supporting project funding and scheduling.

These three evaluation processes accomplish the objective of obtaining regulatory and budgetary approval for remediation projects. The QRAs provide an initial categorization of waste sites, so as to obtain regulatory approval of the cleanup process. Waste sites and facilities are evaluated in the RREs to develop evaluations of risk to the public, as well as worker health and safety. These values are incorporated into the RDSs, which use additional programmatic considerations to prioritize the Richland ER Project work scope.

4.1 RELATIVE RISK AND ASSOCIATED FACTORS

4.1.1 RCRA/CERCLA Risk Assessments

Environmental restoration at the Hanford Site is regulated under RCRA and CERCLA. These authorities require risk assessments to evaluate potential threats of hazardous chemical releases to human health and the environment. During the initial stages of the Hanford Site cleanup, baseline risk assessments were performed (following EPA guidance) to determine if remedial actions were required. However, because DOE, EPA, and Ecology agreed that site cleanup to meet anticipated future uses would occur, the evaluation process was shortened by replacing baseline risk assessments with QRAs in accordance with the HPPS. This encourages a bias-for-action approach to fund remediation projects, and forgoes the baseline risk assessment evaluation process (which costs as much as the remediation itself).

QRAs provide a limited quantitative evaluation of risk to human health and the environment, as agreed upon by DOE, EPA, and Ecology (see Section 3.3). The fundamental requirement for performing a QRA is that information is available for a risk calculation and/or risk rating. The QRAs provide characterization information to determine whether an immediate abatement of risk is required as an ERA, or if cleanup can be readily agreed upon, but is not time-critical, so that IRMs are appropriate.

QRAs evaluate multiple risk exposure pathways to a variety of potential receptors. Typical hazard sources include chemicals and radionuclides in waste sites, contaminated soils and groundwater, and deteriorated buildings. Industrial hazards are also a significant component of risk at the Hanford Site. Conceptual models describing the risk scenarios are summarized in Appendix D.

Initial prioritization of the Richland ER Project work scope was based entirely on the results of the baseline risk assessments and QRAs. The work plans and schedules that resulted were

4.0 SITE RELATIVE RISK

codified in the *Tri-Party Agreement*, in the form of enforceable milestones. RODs were then issued to authorize remediation work at the 1100 Area, 100 Area, and 200 Area NPL Sites. A ROD for the 300 Area is expected to be issued during FY96. Hanford Site remediation work is proceeding in accordance with this authority/obligation to proceed.

As competition for available funds for ER and waste management activities has increased, the RDS and RRE risk assessment methodologies have come into use to aid in differentiation of risk reduction opportunities, so that the most effective allocation of funds for competing activities/needs can occur.

4.1.2 Relative Ranking Evaluation (RRE) and Risk Data Sheet (RDS) Processes

The RRE process has been implemented by EM-40 to provide a consistent basis for evaluation and comparison of the relative risks of ER work to the public, the site work force, and the environment. The RRE methodology incorporates both objective and subjective inputs to assess risks based on the degree of hazard represented by the source, the nature of the pathway by which the hazard might impact potential receptors, the likelihood that exposure will occur, and the likelihood that receptors will be exposed to contaminant migration or hazard exposure. The RRE computes numerical scores for the risk of separate work activities, and then categorizes the risks as High, Medium, or Low, based on prescribed ranges for the numerical scores.

The RDS process has been implemented by EM-1 to provide a consistent basis for evaluation and comparison of the relative risks of all work, including the ER component. The RDS process actually assesses overall programmatic risk, including the safety and health risk to people, as well as the potential for damage to the environment. Additional factors included in the RDS evaluation (compared to the RRE evaluation) are mission impact, mortgage reduction, and socioeconomic/cultural values. The RDS methodology also computes numerical scores for the risk of separate work activities, and then categorizes the risks as High, Medium, or Low, based on prescribed ranges for the numerical scores.

4.2 SUMMARY OF RESULTS

Table 4-1 presents RRE results for source release waste sites to be addressed through FY98. Table 4-2 presents results for facilities. The first column in Table 4-1 represents the Richland ER Project's high priority sites, as determined through the CERCLA/RCRA process. The second column is the pathway source hazard component (soil or groundwater). The third column is the RRE score, which is defined by a High, Medium, and Low designation. The results for source waste sites indicate that there are moderate to significant risks associated with the source units.

4.0 SITE RELATIVE RISK

The RRE results for facilities indicate that the risks are primarily associated with industrial hazards existing at the retired facilities, with the main receptor being the D&D worker conducting S&M activities. The risks at the facilities that will be addressed in the next one to five years are significant.

The RDS results are presented in Table 4-3 for each of seven categories. The RRE scores are utilized for the first two categories. RDSs are evaluated for a group of sites (or activities) that portray a similar risk, and they are not specific to separate waste sites. As shown in the RRE scores, the release sites are easily incorporated into RDS waste site groupings, based on specific geographic areas of similar risk. The RREs allow for changes in the associated RDS scores, based on project managers' assessments. This applies to scores associated with the 200 Area Public Health and Safety category, and for both categories associated with the 300 Area. These scores are based on an evaluation of the severity and likelihood of the potential consequences.

As shown in Table 4-3, the major influencing factors on priorities (based on the RDS score) are the remaining five categories besides the risk to the public and Hanford Site workers. The rating is consistent with the fact that all ER project sites have already been categorized as high priority during the CERCLA/RCRA process. This underscores the importance of such factors as stakeholder concerns about the environment and the Columbia River, compliance with enforceable agreements, and support for the Hanford Site mission. The Richland ER Project balances all these factors in determining optimized priority lists.

Prioritization for funding within the Richland ER Project has been based upon agreements, milestones, and relative importance of sites (as stated in the *Tri-Party Agreement*). RL, EPA, and Ecology based their selection of sites for remediation upon input from the public, tribal entities, and stakeholders. Factors considered during this ranking/selection process included protection of the Columbia River, minimizing spread of contaminations, and incorporating public concerns regarding perceived threats. These concerns resulted in the funding of projects with high visibility, where cleanup activities were actually occurring. The necessity of considering the factors not included in the prescribed guidance for the MAP is that the results of the risk evaluation process do not accurately reflect the complexity of all factors affecting Hanford Site activities and projects.

4.0 SITE RELATIVE RISK**Table 4-1. RRE Results for Source Release Waste Sites.**

Waste Site	SHF	RRE Score
100- BC		
116-B-1	SOIL	MED
116-B-2	GW	MED
116-B-3	GW	MED
116-B-4	GW	MED
116-B-5	GW	MED
116-B-6A	SOIL	MED
116-B-6B	SOIL	MED
116-B-9	GW	MED
116-B-10	GW	MED
116-B-11	SOIL	MED
116-B-12	GW	MED
116-B-13	SOIL	MED
116-B-14	SOIL	MED
116-C-1	SOIL	MED
116-C-5	SOIL	MED
B Pipeline	SOIL	MED
100 D/DR		
107-D/DR1	SOIL	MED
107-D/DR2	SOIL	MED
107-D/DR3	SOIL	MED
107-D/DR4	SOIL	MED
107-D/DR5	SOIL	MED
116-D-1A	GW	MED
116-D-1B	GW	MED
116-D-2A	GW	MED
116-D-4	GW	MED
116-D-6	GW	MED
116-D-7	SOIL	MED
116-D-9*	GW	MED
116-DR-1	SOIL	MED
116-DR-2	SOIL	MED
116-DR-9	SOIL	MED
D Pipeline	SOIL	MED
100-HR		
116-H-1	SOIL	MED
116-H-2	GW	MED
116-H-4	GW	MED
116-H-7	SOIL	MED
H Pipeline	SOIL	MED
100 FR	GW	MED
100 KR	GW	MED
100 NR	GW	MED
200 AREA		
ZP-1	GW	MED
BP-5	GW	MED
UP-1	GW	MED
300 AREA		
Process ponds	SOIL	HIGH
Process Trenches	SOIL	HIGH

* No significant soil contaminants identified.

4.0 SITE RELATIVE RISK

Table 4-2. RRE Results for Facilities.

Facility	Source Hazard Component	RRE Score
100 Area		
183 C Filter Building	Industrial	High
190 C Complex	Industrial	High
104 B1 Tritium Vault	Industrial	High
104 B2 Tritium Vault	Industrial	High
1701 BA Badge House	Industrial	High
103 B Unirradiated Fuel Storage	Industrial	High
1608 B Vacuum Seal	Industrial	High
1702 C Badge House	Industrial	High
105 C Water Tower	Industrial	High
105 High Tanks	Industrial	High
1714 C Solvent Storage	Industrial	High
116 - B Stack	Industrial	High
105 - C Safe Store	Industrial	High
200 Area		
233 S PU Concentration Facility	Radiological	High

4.0 SITE RELATIVE RISK

Table 4-3. Risk Data Sheet Results.

RDS Waste Site Groupings	RDS VALUES																	
	Public Safety & Health			Site Personnel Safety & Health			Environmental Protection			Compliance**		Mission Impact**		Mortgage Reduction		Social/Cultural/Economic		
Soil:	Before *	During	After	Before *	During	After	Before	During	After	Before	After	Before	After	Before	After	Before	During	After
100 B/C	Med	Med	Low	Med	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
100 DR	Med	Med	Low	Med	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
100 HR	Med	Med	Low	Med	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
100 KR	Med	Med	Low	Med	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
100 FR	Med	Med	Low	Med	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
100 NR	Med	Med	Low	Med	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
300 FF	Med ³	Med	Low	Med ³	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
200 BP	Low	Low	Low	Med	Med	Low	High	High	Med	High		High		Med	Med	High	High	Med
200 ZP	Low	Low	Low	Med	Med	Low	High	High	Med	High		High		Med	Med	High	High	Med
GW:																		
100 HR-3	Low	Low	Low	Low	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
KR	Low	Low	Low	Low	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
100 FR	Low	Low	Low	Low	Low	Low	Low	Low	Low	High		High		Med	Med	High	High	Med
100 B/C	Low	Low	Low	Low	Low	Low	Low	Low	Low	High		High		Med	Med	High	High	Med
300 FF	Low	Low	Low	Low	Low	Low	Low	Low	Low	High		High		Med	Med	High	High	Med
NR	Med	Med	Low	Low	Med	Low	High	High	Low	High		High		Med	Med	High	High	Med
200 UP	Low ²	Low	Low	Med	Med	Low	Med	High	Low	High		High		Med	Med	High	High	Med
200 ZP	Low ²	Low	Low	Med	Med	Low	Med	High	Low	High		High		Med	Med	High	High	Med
200 BP	Low ²	Low	Low	Med	Med	Low	Med	High	Low	High		High		Med	Med	High	High	Med
Facilities: ¹																		
100 D&D	Med	Med	***	High	High		Med	Med		High		High		High	High	High	High	
200 D&D	Low	Low		High	High		Med	Med		High		High		High	High	High	High	

* - Values are from RRE results.

** - "During" scenario is not applicable.

*** - Blank entries were evaluated as not applicable.

1 - All facilities from the RRE are grouped into the D&D RDSs.

2 - RRE Score was medium.

3 - RRE Score was high.

5.0 ENVIRONMENTAL RESTORATION STRATEGY

This section summarizes the key assumptions of the environmental restoration strategy, along with proposed strategies for near- and long-term remedy selections. The Richland ER Project has implemented a bias-for-action plan that incorporates streamlined measures for reduced paperwork activities and expedited schedules for remedial field actions.

The Hanford Environmental Restoration Strategy involves a dynamic, developmental process. The Hanford Site's diverse environmental conditions and multiple external influences create the need for a systematic method to establish goals and set priorities for the Richland ER Project. To succeed, this strategy must balance diverse stakeholder values, regulatory requirements, environmental risks, worker safety, limited budgets, constrained funding, and cost accountability.

The Richland ER Project is achieving its goals by streamlining ER activities so that field work is being accomplished in the most cost-effective and timely manner possible. This section of the MAP document presents the key assumptions from which long-term and near-term strategies are being developed. This section discusses how implementation of these strategies leads to the logical and effective selection and application of remedies to the Hanford Site's complex environmental contamination problems.

5.1 ENVIRONMENTAL RESTORATION STRATEGY: KEY ASSUMPTIONS

Strategies for remediation were developed on the basis of the following key assumptions.

- Maintaining the Hanford Site's commitment to protect workers and ensure public safety and health is the top priority.
- The sequence of environmental restoration begins along the Columbia River (100 and 300 Areas), then moves inward toward the central plateau (200 Area). The central plateau is anticipated for long-term waste management activities, with limited remediation. To address concerns about risks posed by Hanford Site derived contaminants entering the Columbia River, work has progressed with the Columbia River Comprehensive Impact Assessment (CRCIA) management team to (1) perform screening level assessments of human health and ecological risks; and (2) identify requirements for a comprehensive assessment. The need for additional follow-on work will be based on results from the study.
- Groundwater contamination that is presently impacting the Columbia River, or which may impact the river in the future, will be aggressively remediated.

5.0 ENVIRONMENTAL RESTORATION STRATEGY

- Infrastructure (e.g., roads, utilities, and laboratories) is (or will be) available to support environmental restoration activities.
- Existing technologies are adequate to initiate restoration. New technologies will be demonstrated and implemented to improve the cost effectiveness of the remediation work.
- The budget for the Richland ER Project will decrease over the next three years, and will remain stable thereafter.
- Projected costs and current schedules are based on current waste acceptance criteria and treatment plans.
- Some locations will require active restoration to make the land suitable for other uses.
- The four tribal entities and other stakeholder values will be integrated in Richland ER Project planning and implementation.
- Stakeholder input is presently represented by the *Future Site Uses Working Group (FSUWG) Report*.
- The ERDF will open as scheduled on or before October 1, 1996, and will not be required to accept remediation wastes from other DOE sites.
- The issues identified in Section 7.0 will be resolved.

The existing scope, cost, and schedule baseline of the Richland ER Project is currently being used for out-year planning. Active dialogue is occurring between the regulators, stakeholders, and four tribal entities regarding this baseline. The parties have agreed on overall priorities for the near-term work, costs, and schedules.

5.2 ENVIRONMENTAL RESTORATION STRATEGY: STRATEGY FOR REMEDY SELECTION

The environmental restoration strategy embodies a bias-for-action, with an emphasis on performing near-term interim actions while solutions are developed for long-term remedial needs. This section of the MAP document outlines the historical background of the Hanford Site remedy selection process, and discusses the current strategic plan which the Richland ER Program is proposing for remedial action.

5.0 ENVIRONMENTAL RESTORATION STRATEGY

The Hanford Site contains four NPL sites under CERCLA. Remediation of these sites is proceeding in accordance with the *National Contingency Plan* (NCP) found in 40 CFR §300.330. The *Tri-Party Agreement* includes inactive waste disposal and unplanned release sites that are scheduled for remedial actions. These sites are grouped into operable units. The *Tri-Party Agreement* also includes RCRA TSD facilities that will be closed or permitted to operate in accordance with Washington State dangerous waste regulations. The TSD facilities are located within the operable units at the Hanford Site.

The Hanford Site operable units have a complex nature. Characterizing existing mixed waste and hazardous waste contamination, and obtaining sufficient data to allow final remedies to be established, is a time consuming and costly process. Attempting to apply traditional CERCLA remedial options to the Hanford Site resulted in lengthy investigation schedules. DOE and regulatory agencies became concerned that too much time, and too large a fraction of a limited budget, would be spent before actual remediation activities could commence.

A number of lessons learned indicate that many operable units have similar physical characteristics or chemical/radiological contaminants of concern. All parties to the *Tri-Party Agreement* recognized that all investigations of past-practice units must be managed and implemented under one characterization and remediation strategy. There was also a need to coordinate past-practice investigations with the RCRA closure activities. The parties to the *Tri-Party Agreement* negotiated a method to implement the CERCLA process in order to (1) accelerate the assessment phase; and (2) coordinate RCRA and CERCLA requirements whenever possible, thereby resulting in cost savings.

Since the goal of the CERCLA program is remediation, much more emphasis needed to be placed on initiating and completing waste site remedial actions at the Hanford Site. *The Hanford Past Practice Strategy (HPPS)* was developed in 1991 to accelerate decision-making and initiation of remediation through the following activities:

- Maximizing the use of existing data consistent with data quality objectives.
- Undertaking ERAs and/or IRMs (as appropriate) to remove threats to human health and the environment.
- Reducing risk by decreasing toxicity, mobility, or the volume of contaminants.

The HPPS implements a bias-for-action approach through optimizing the use of interim remedial actions, culminating in decisions on final remedies at the operable unit and aggregate area management level.

5.0 ENVIRONMENTAL RESTORATION STRATEGY

The observational approach is an important element of the past practice strategy. This approach combines information from historical process operations, including historical liquid effluent discharges, and information from limited field investigations on the nature and extent of contamination, as well as a "characterize-and-remediate in one step" methodology. This methodology consists of contingency planning prior to site excavation and field screening for contaminants at sites where remedial action and remedial goals have been selected. This approach has demonstrated that remedial goals can be achieved through a combination of field screening and confirmational sampling.

The *Aggregate Area Management Study* (AAMS) scoping approach has been utilized in the 200 Area. This approach led to the restructuring of OUs to streamline the assessment process. One of the key changes resulting from this approach was the separation of groundwater and source OUs. This enables the groundwater plumes to be addressed at a regional level, and not for each source OU group.

By building upon certain key assumptions, and by streamlining the remedial process, long-term and near-term strategies were developed. These strategies serve as the basis for remedial selection and the balanced risk management approach that is discussed in the following sections.

5.2.1 Proposed Long-Term Strategy

Remediation activities that are initially focused near the Columbia River are being conducted using a phased approach. Restoration activities will gradually progress inward, toward the central plateau. Waste generated during remediation is to be transported to the central plateau for disposal in a central waste management area. Figure 5-1 depicts the this overall strategy. (Note: This is a long-term general strategy, not a short-term prioritization; actual approaches may vary in individual OUs and waste sites.)

5.2.1.1 Begin Work Near the Columbia River and Gradually Progress Toward the Central Plateau. Remediation of facilities, soils, and groundwater closest to the Columbia River is the near-term focus for Richland ER Project activities. This focus mitigates the potential for migration from sources near the river, and provides for the possibility of other beneficial uses of land adjacent to the Columbia River in a timely matter. Facilities, soils, and groundwater on the central plateau will be contained and monitored to assure that migration of contaminants toward the river is curtailed or stopped. Focus will be shifted towards remediation of the central plateau as activities near the Columbia River are completed.

5.2.1.2 For a Given Waste Management Area, Work from the "Outside In." Remediation is proceeding from the outside of contaminated zones toward the central facility, based on the assumption that the central facility (reactor or fuel reprocessing facility) will contain the highest levels of contamination and will represent the greatest environmental hazard in a given waste

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Figure 5-1. Richland Environmental Restoration Project Long-Term Strategy Diagram.

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management area. Remediation of an area will be accomplished by remediating the outlying sites and ancillary structures first, then progressing toward the facility over time. This will maximize the remediated land area and minimize exposure to workers, the public, and the environment. Care will be taken not to "recontaminate" remediated property as this work progresses inward towards the core contamination.

5.2.1.3 For a Given Waste Management Area, Work from the "Top Down". Remediation activities will initially focus on removing surface facilities and structures, and then will move to the remediation of underlying contaminated soils, finally progressing to remediation of the groundwater. Removal of overlying contamination will be the most efficient approach, with each contaminated area being remediated only once.

5.2.1.4 Consolidate Long-Term Waste Management Activities to the Central Plateau. Remedial wastes removed during remedial operations will be moved to the central plateau so as to minimize potential exposure to the environment. Remedial waste management activities will be located in the same area as the high-level waste storage tanks, thus minimizing the amount of land required for long-term waste management. This area is also farthest from the river, and highest above groundwater, and will facilitate the use of common monitoring systems. This does not mean that all contamination will be removed from the 100 and 300 Areas. However, any remedial waste that is removed from a waste disposal site in the 100 and 300 Areas will not be redeposited in those areas, but will be disposed in the 200 Area. Treatment of waste will be performed (if required).

5.2.1.5 Consider Balanced Risk Management and Future Land- Use in Establishing Project Priorities. To establish priorities during the process of site restoration, the long-term strategy includes consideration of such factors as future land uses (see Section 2.6) and balanced risk management issues (see Section 5.3.3).

5.2.2 Near-Term Strategy

In 1993, DOE initiated the Optimized Baseline Project (OBP). Regulator and stakeholder values were assessed and applied to the near-term planning for the project. In 1994, based on the information developed in the OBP, DOE and the regulators "refocused" the Richland ER Project through a series of negotiations resulting in major changes to the *Tri-Party Agreement*. Whereas the major emphasis had been on the site-wide assessment of waste, the refocusing placed a new emphasis on remediation. The baseline work scope reflects a near-term strategy for accelerated remediation in the 100 and 300 Areas, groundwater treatment activities in the 100 Areas, and groundwater containment in the 200 Area. Additionally, emphasis in D&D is on near-term progress and integration with the 100 Area remediation activities. The near-term strategy also envisions waste consolidation in the 200 Area, and an increase in facility transition from shut-down status to D&D, which will result in mortgage reduction costs.

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In the spring of 1995, near-term objectives were further refined. Agreements with regulators on the proposed plans for 100-HR and 100-KR groundwater treatment added two major pump-and-treat projects to address the chromium contamination that has the potential to impact salmon in the Columbia River. Additionally, the 200-ZP and 200-UP pump-and-treat projects were upgraded to contain the spread of carbon tetrachloride and uranium plumes. In July 1995, additional changes were made to accelerate N-Reactor deactivation and concentrate the initial 100 Area remedial actions in the 100-BC Area. These actions were recommended to accelerate the reduction of the N Reactor mortgage and demonstrate near-term visible progress.

5.3 SITE-WIDE RELEASE AND SITE-MANAGEMENT STRATEGY

The Richland ER Project incorporated DOE's strategic planning decisions into the process to redefine site-specific cleanup strategies. Each of DOE's higher-level strategic plans have key flow-down provisions that link with the Richland ER Project strategies. Common elements include a preference for the following:

- Reducing urgent risks.
- Using a balanced risk management-based decision process.
- Incorporating customer and stakeholder values into the decision making process.
- Utilizing future Hanford Site land use decisions to derive cleanup standards.
- Establishing a method to reduce costs of remedial activities so they are in line with private sector costs for similar activities.
- Clearly defining the roles and responsibilities of all involved agencies.

Remedy selection at the Hanford Site encompasses the full range of options under the CERCLA process. As each OU is characterized and moves through the CERCLA process, preferred alternatives are identified and presented to the public for comment through focus sheets, proposed plans, or amendments to other regulatory documents (e.g., RCRA Part B permit). Once regulators, stakeholders, and the general public have been given the opportunity to provide input into the process, the regulators issue an enforceable ROD.

Significant progress has been made in implementing the bias-for-action formulation (see Section 5.3.1, below). As these strategies are further refined, field work will continue to be performed in an expeditious and cost-efficient manner.

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5.3.1 Streamlining Strategy

The *Tri-Party Agreement* process initially mandated six OU work plans to be developed every year. This process has been maintained for those OUs that were part of the initial six work plans. However, as part of the HPPS process, the signatories of the *Tri-Party Agreement* determined that the process was too time consuming and costly to complete. The remaining work plans were rescheduled and the assessment work was modified to expedite the assessment work and move towards field remediation.

One method of streamlining the assessment work has involved the use of analogous information for making remedial decisions, instead of fully characterizing each individual waste site. Process history has been used to group sites from multiple OUs into categories. It has also been assumed that analytical data for one site is representative of conditions at all similar (analogous) sites. Without extensive site specific data, baseline risk assessments cannot be prepared. However, the analogous data has been deemed sufficient to prepare QRAs to establish cleanup goals and support interim remedial measures.

This approach was used for preparing the focused feasibility study that led to the ROD for interim action for high priority liquid waste disposal sites in the 100-BC-1, 100-DR-1, and 100-HR-1 OUs. For that ROD, considerably less resources were expended on waste site assessment than those typical of the traditional CERCLA RI/FS process. Analogous data is now being compiled to support interim remedial decisions for the remaining 100 Area waste sites. For the sites that are similar to the ones in the initial ROD, minimal assessment documentation will be required and the same remedial alternative will be selected.

Remediation at the Hanford Site is still governed by the *Tri-Party Agreement*. Milestones established in the *Tri-Party Agreement* have been met with great success. Milestones were frequently completed ahead of schedule. However, decreased funding will significantly impact the Richland ER Project's ability to meet future milestones. This could reflect adversely on the Hanford Site, as stipulated penalties prescribed in the *Tri-Party Agreement* could be imposed by the regulators for missing milestones and public enforcement actions could be brought under the citizen suit provision of the *Tri-Party Agreement*. A significant renegotiation of the *Tri-Party Agreement* is necessary to validate the long range strategy, further incorporate the ER bias-for-action, and reduce costs under the present milestone schedule.

5.3.2 Expedited Remediation Strategies

Two types of interim action remedies are currently being implemented at the Hanford Site. These include ERAs and IRMs.

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An ERA is usually triggered by conditions that might represent an imminent threat or future unacceptable health risk to humans or the environment. The ERA is often associated with a short time frame that is available to mitigate the conditions that may pose a potential problem. Thus far, nine ERAs have been initiated within the Richland ER Project, with six completed.

The concept of a limited field investigation (LFI) provides a streamlined process through which site data (usually the minimum needed for an IRM or other interim decision) can be obtained in a less formal manner. A key distinction between an LFI and a remedial investigation (RI) is that an RI is intended to be sufficiently comprehensive to support the final ROD, while the LFI may or may not serve that purpose. The focused feasibility study (FFS) tiers off the LFI, and therefore is usually more limited in scope than a full-blown feasibility study. These limited studies allow for IRMs to be implemented before a site has been fully characterized. For many sites sufficient data exists at an early stage in the investigation, thereby allowing decisions to be made regarding an IRM. The IRM is designed to reduce the migration of hazardous constituents and contain the contamination to a specified area until final remedial decisions can be made. Additionally, data collected during interim actions (using the observational approach) can be used to complete an eventual RI in support of final remedial decisions. In some cases the interim measure may eventually suffice as the final remedy.

LFIs and FFSs have been completed at several OUs in the 200 and 300 Areas, allowing field work to begin years earlier than originally scheduled. Several ERAs have been implemented thus far. The 618-9 Burial Ground ERA was considered to be time critical, and several drums of hexone that were suspected to be contaminated with uranium were removed to prevent continued releases to the environment. The high priority liquid waste sites within the 100 NPL site are currently being addressed under the IRM approach.

5.3.3 Balanced Risk Management Strategy

A balanced risk management approach was used in determining the priority of the Richland ER Project workscope. Common elements used in the balanced risk management approach include the following:

- Risk to workers during restoration.
- Industrial risks as aging facilities deteriorate.
- Potential risks to the environment from aggressive restoration activities.
- Potential impacts from use of natural processes.
- Value of land as a resource to support multiple uses.

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- Protection of natural and cultural resources.
- Stakeholder, trustee, and tribal entity values.

The DOE developed and compared risk-based remedial strategies that (1) protect the public, workers, and environment; (2) are executable from a technical perspective; and (3) fit within an expected annual funding profile. The evaluation team applied a cost analysis approach that defined the funding required for "minimum safe operations," quantified payoffs from mortgage reduction activities, and resequenced remediation work to maximize results within the budget targets.

While the RRE ranking system employed by the MAP shows that most OUs rank in the low-to-medium risk category, other factors must be considered at the Hanford Site to establish remediation priorities. Key among these factors are enforceable legal obligations and stakeholder interests, including those of the four tribal entities. Many areas of the Hanford Site have both religious and archeological significance for the tribal entities.

Another reason why the Hanford Site's low-to-medium risk sites must be considered as high priority sites is that many of the waste sites are causing off-site contamination of the Columbia River. The Columbia River is a prime recreational resource and drinking water resource for the Pacific Northwest.

5.4 NON-ENVIRONMENTAL RESTORATION REGULATORY STRATEGY

Some of the regulatory requirements existing outside of the traditional Environmental Restoration program under CERCLA that must be accommodated include RCRA, National Resource Damage Assessment (NRDA) provisions of CERCLA, and NEPA. In the RCRA realm, the potential exists for the RCRA groundwater monitoring program to be adversely affected when remedial actions are implemented that include groundwater withdrawal or discharge near existing RCRA TSDs. In severe cases, the RCRA monitoring program may be rendered useless due to changing hydrologic or baseline conditions. RL has proposed a process to anticipate and mitigate these impacts (to the extent feasible) to the regulators, as part of the regulatory compliance decision making process. As changes occur or are contemplated, the process is expected to effectively coordinate decision making for all groundwater monitoring programs.

As part of the RCRA/CERCLA integration within certain operable units at the Hanford Site, conflicts develop when trying to schedule the incorporation of TSD closures into the Hanford Site RCRA Permit. Since permit modifications are limited to one time each year, the

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incorporation of TSD closures that are integrated with an operable unit work plan must be scheduled to coincide with the analogous CERCLA documentation. To minimize schedule conflicts, RL has designed the feasibility study or proposed plan process to coincide with publication of the TSD closure plan for public review. Once the public comment period is completed, the CERCLA process and the RCRA permit revision processes can proceed together.

A component of CERCLA that is outside the traditional remediation process is the natural resource issues addressed by the trustees. At the Hanford Site, RL functions as both a trustee and a Potentially Responsible Party (PRP) regarding natural resource assessments. To accommodate this unique situation, the Richland ER Project is proactively addressing natural resource issues within the CERCLA remediation process to provide the most efficient and cost-effective means to fulfill all of DOE's obligations.

In a similar fashion, NEPA presents additional requirements outside of the ER project for major federal decisions. To accommodate NEPA requirements, the Richland ER Project addresses NEPA values as part of CERCLA remediation documentation. This approach avoids the need for duplicative analysis documents and minimizes the lengthy review process normally associated with NEPA decisions. NEPA requirements are also closely tied to requirements for cultural surveys under the *National Historic Preservation Act*. The Richland ER Project is very sensitive to the requirements specified by these acts, as 283 archeological sites have been found at Hanford and 48 of these sites are included in the National Register of Historic Places.

There are several other environmental and natural resource laws that must be accommodated within the project. These include the *Clean Water Act*, the *Clean Air Act*, and the *Wild and Scenic Rivers Act*. Certain air emissions from Richland ER Project activities or facilities may be regulated under the Air Opening Permit program administered by the Washington Department of Ecology. Although this permit has not yet been issued, the Richland ER Project has included the necessary information on the affected emission sources in the application submitted in 1995. The Richland ER Project also has liquid effluent discharges to surface waters that are subject to the NPDES provisions of the Clean Water Act. As deactivation of facilities and environmental cleanup continues, the number of NPDES-permitted effluent sources continues to decline. Current NPDES activities are limited to routine monitoring of affected outfalls.

5.5 PROJECT SUPPORT ACTIVITY STRATEGY

Section 3.4 contains a detailed discussion of Richland ER Project Support activities. This section of the MAP document presents strategies to maintain support activities, and to address other significant interrelated activities that influence the Richland ER Project. A summary of strategies is presented below:

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- **Public participation/stakeholder involvement** - It is critical to the success of the Richland ER Project for the stakeholders to have confidence in decisions concerning cleanup of the Hanford Site. Proactive efforts will continue to be made to involve stakeholders in the decision-making process. The following public involvement activities will continue to be implemented and improved upon:
 - Conduct monthly meetings with the Hanford Advisory Board (HAB).
 - Conduct public outreach activities to inform the citizens of the Tri-Cities area about the progress of the project.
 - Continue monthly public tours of the Hanford Site.
 - Respond to local citizen requests for information in a timely manner.
 - Continue to meet with tribal entities to enhance communication on critical issues of concern.
 - Provide opportunities for the regulators and tribal entities to have input to the decision-making process via the MAP and other appropriate processes.
 - Continue to implement information management systems (such as Netscape) that allow stakeholders easy and available access to information concerning the site.
- **Program Management** - The Richland ER Project is defined by a matrix organization that assigns both project and functional responsibilities to managers. The project has been divided into six subprojects. The subprojects include Program Management and Support, Remedial Actions, Groundwater, N-Reactor, Decontamination and Decommissioning, and ERDF. The continued incorporation of this summary subproject matrix directly within the project Work Breakdown Structure (WBS) promotes effective management of the diverse activities required to integrate and maintain interfaces among all project participants. Efforts also include improving the WBS to favor an effective business approach. This includes baselining the project through its entire life span (rather than from one fiscal year to the next). The Richland ER Project also has, as a part of its strategy, compliance with the DOE Streamlining Act of 1995 and incorporation of both small disadvantaged business and woman-owned business goals into its program. The Richland ER Project has also incorporated Performance Objective Criteria to provide incentives for outstanding performance by its contractors.

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- **Site-wide Services** - Coordination and evaluation of these essential activities will continue through effective Richland ER Project interaction among the supporting groups. Presently, these services are provided by the M&O contractor.
- **Technology Development Interfaces to Meet ER Program Needs** - The technology development interface will continue to be directly managed within the PM&S summary subproject as a division of the Technical Services group. More effective technologies for remediation are being aggressively pursued and tested on a pilot-scale basis in the field. These proactive efforts will continue and will be expanded as more viable technologies are developed. The Richland ER Project will continue to interface with EM-50 to test newly developed technologies in the field. The Richland ER Project will continue to be actively involved with the Site Technology Coordination Group (and other agencies) to avoid duplication of efforts.
- **DOE Orders** - Currently, the DOE order matrix is going through a major revision. Many of the DOE orders have been superseded by new orders under the Accelerated Directives Reduction Initiative. Evaluation on the applicability of DOE orders to the Richland ER Project will continue on an activity-specific basis.
- **Environmentally-Related Activities Governed by Other Entities** - The DOE will continue to fulfill its legally binding and enforceable commitments to Hanford Site regulators and trustees, as embodied in the *Tri-Party Agreement*. Implementation will be achieved and milestones will be met in a scientifically sound and cost-effective manner. Interfaces will continue with other DOE management teams at the Hanford Site to coordinate regulatory activities (e.g., Part B permit closure activities) that are outside the scope of the ER program yet could possibly impact the schedule and cost of ER activities. Likewise, DNFSB initiatives and guidance developed by the Nuclear Regulatory Commission will also continue to be reviewed and evaluated for potential impacts to DOE operations at the Hanford Site. The pilot project described in Section 3.4.6 will be initiated within the Richland ER Project to determine to what extent DOE nuclear facility and worker safety requirements are already satisfied through the implementation of CERCLA requirements and the *Tri-Party Agreement*.

5.6 PERFORMANCE MEASURES

In FY97, the *Government Performance and Results Act* (GPRA) will become law and will require that each government site develop performance measures for their government-funded programs. Summarized below are the project-specific performance measures, grouped into the

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four HQ-strategic measure categories, as expressed in the August 1995 *Environmental Restoration Strategic Plan*.

Section	Title/Category	HQ Strategic Measure
5.6.1	Relative Risk Reduction	Strategic Measure #1
5.6.2	Lands and Facilities Status	Strategic Measure #2
5.6.3	Resource Distribution	Strategic Measure #3
5.6.4	Program Efficiency	Strategic Measure #4

5.6.1 Relative Risk Reduction - Strategic Measure #1

The Richland ER Project's mission is to protect human health and the environment from risks posed by contaminated waste sites and facilities. Relative risk reduction is one of four key strategic measures (goals) established by HQ in support of this mission. Describing risk-reduction accomplishments in quantifiable terms can exercise a very positive influence on future budget decisions affecting the Hanford Site.

5.6.1.1 Relative Risk Reduction. Using the RRE process described in Section 4.1, release sites and surplus facilities assigned to the Richland ER Project have been classified into relative risk categories based on their potential for damage or harmful effects to members of the public, environmental resources, or Hanford Site workers. In Figure 5-2, relative risk reduction is summarized over time for the following three RRE relative risk categories. (*Refer to Sections 4.1 and 4.2 of this document for additional RRE detail.*)

High Relative Risk (e.g., D&D Projects)

Medium Relative Risk (e.g., Remedial Action projects in the 100 and 200 Areas)

Low Relative Risk (e.g., No project identified in the low risk category)

Figure 5-2 also presents a "completed - no further action" category. This category represents the optimum end-state at which total risk reduction measures have been successfully implemented, thus eliminating unacceptable threats to human health and the environment.

From FY95 to FY 2002, a combination of 175 high and medium waste sites and facilities that once posed a serious or high relative risk to human health and indigenous natural resources at the Hanford Site will be remediated.

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Figure 5-2. Relative Risk Reduction.

5.6.1.2 Relative Risk Funding Trends Profile. As part of Strategic Measure #1, Figure 5-3 presents the total funding requirement for reducing risk over time. Using the same RRE relative risk information (high, medium, and low) for waste sites and surplus facilities in Figure 5-2, Figure 5-3 shows decreasing funding profiles for each relative risk category over time. (Note: Figure 5-3 does not include the deactivated facilities to be transitioned or transferred from other programs at the Hanford Site. As more facilities become deactivated and transitioned into the D&D program, increased funding will be required to meet the increasing challenges of a growing surplus facility inventory).

5.6.1.3 Budgets and Program Priorities. Using the same RRE categories (i.e., high, medium, and low) and the core program category shown in Figure 5-3, Table 5-1 provides a summary-level list of the following information.

Level of Risk	-	High, medium, low, and core program (plus two additional categories [i.e., program management and other]).
Budgets	-	Budget dollars identified individually for each fiscal year between FY95 - FY 2000, and a composite value calculated for fiscal years 2001 and beyond.

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Figure 5-3. Total Funding Requirements by Risk Category.

Number of Activities - Number of completed sites and facilities identified individually for each fiscal year between FY95 - FY 2000, and a composite number for fiscal years 2001 and beyond.

Table 5-1 lists the budgeted dollars and corresponding number of activities required to support large cleanup projects at the Hanford Site. Large site decommissioning projects and large site remedial action projects have been classified into six levels of risk (i.e., high, medium, and low, as depicted earlier, plus program management, groundwater management, and other).

All of the Richland ER Project large site remedial action projects located in the 100 and 200 Areas represent a medium relative risk, whereas all of the decommissioning projects (along with remediation of waste sites located in 300-FF) have been identified as high relative risks.

5.6.2 Lands and Facilities Status - Strategic Measure #2

Land and facility status and trends are an integral part of the Richland ER Project's performance measurement system, which reports tangible results regarding the Hanford Site cleanup mission. In support of HQ's strategic measure for "Lands and Facilities Status," detailed waste site and

5.0 ENVIRONMENTAL RESTORATION STRATEGY**Table 5-1. Budget and Activity Level by Risk Category.**

Activity	FY 1996		FY 1997		FY 1998		FY 1999		FY 2000		FY 2001		FY 2002		Project To-Go Costs	
	Budget	Number of Activities	Budget	Number of Activities	Budget	Number of Activities	Budget	Number of Activities	Budget	Number of Activities	Budget	Number of Activities	Budget	Number of Activities	Budget	Number of Activities
High Relative Risk																
Large Site Decommissioning	\$46.8	5	\$40.6	2	\$36.4	6	\$30.4	1	\$30.4	4	\$33.4	9	\$33.4	5	\$3,091.6	153
Large Site Remedial Actions	3.8	0	6.3	5	10.7	0	10.7	4	10.7	0	10.7	2	10.7	1	405.7	239
Subtotal	50.6	5	46.9	7	47.1	6	41.1	5	41.1	4	44.1	11	44.1	6	3,497.3	392
Medium Relative Risk																
Large Site Remedial Actions	69.1	0	54.2	2	54.5	19	60.5	15	60.5	60	57.5	1	57.5	2	6,989.6	1005
Subtotal	69.1	0	54.2	2	54.5	19	60.5	15	60.5	60	57.5	1	57.5	2	6,989.6	1005
Low Relative Risk																
Large Site Remedial Actions	0.1	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Subtotal	0.1	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Program Management	33.8	0	29.5	0	29.1	0	29.1	0	29.1	0	29.1	0	29.1	0	2,902.3	0
Groundwater Management	0.0	0	0.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	1,235.2	0
Other	1.6	31	0.2	0	0.2	0	0.2	0	0.2	0	0.2	0	0.2	0	*(44.1)	0
Total	\$155.1	37	\$130.8	9	\$145.0	25	\$145.0	20	\$145.0	64	\$145.0	12	\$145.0	8	14,580.2	1397

Budget entries are in millions of dollars.

Funding for FY 1998 through FY 2002 and To-Go Costs include contingency and escalation.

Performance Fee has been integrated with project costs through FY 2038.

One hundred forty (140) activities were completed in prior years.

* Other includes Technology Improvement Savings of (\$384.1) for FY 2003 through FY 2038.

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surplus facility information traceable to the Richland ER Project Baseline was used in generating the trend tables and figures shown in this section.

Although no final land use decisions have been formally reached for remediation and cleanup of the Hanford Site, a great deal of discussion has taken place that supports other beneficial uses for the Hanford Site. In order to review land and facility status, three key subject areas have been identified:

1. Sites and Facilities Status (Table 5-2)
2. Status of Lands (Table 2-5, Figure 5-4)
3. Facilities Remediation Status (Figure 5-5).

5.6.2.1 Sites and Facilities Status. The Richland ER Project is actively proceeding with aggressive remediation and demolition of contaminated waste sites and surplus facilities. Summarized in Table 5-2 are 1432 waste sites and 285 surplus facilities within the scope of the Richland ER Project. Of the 1432 waste sites, a total of 66 waste sites located in the 100, 200, and 300 Areas are currently underway for either characterization or remediation. A total of 32 waste sites located in the 300 and 1100 Areas are statused as completed remedial action sites. Out of the 285 surplus facilities, 100 surplus facilities have been demolished, leaving a balance of 185 facilities to be completed.

5.6.2.2 Status of Lands. Figure 5-4 provides a general overview of the planned changes in land status (# of acres) over time. In order to describe land status, Figure 5-4 has been divided into the following four phases.

- Study/Cleanup
- Complete and Retained
- Available for Transfer (non-available through FY 2002)
- Waste Management Operations

Starting in FY 1995, 1,432 contaminated waste sites will be in either the study/ cleanup phase or the complete/retained phase. Since final land use decisions have not been made for the Hanford Site, Figure 5-4 shows no land areas available for transfer at this time. Figure 5-4 does show an increasing trend for moving out of the study/cleanup phase and into the completed and retained phase. By the end of FY 2002, approximately 90% of the total acres assigned to the Richland ER Project will have been successfully remediated to cleanup standards that could support other beneficial uses.

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Table 5-2. Sites and Facilities Status.

Installation/ Site	Sites					Facilities			
	Total # of Release Sites	Character- ization (Underway)	Remediation (Underway)	No Action Decisions	Remediated	Total # to be Addressed	# Returned to Use	# Demolished	Not Completed
100 Area Source	421	0	37	0	0	239	0	100**	139
100 Area Groundwater	5*	5	0	0	0	N/A	N/A	N/A	N/A
200 Area Source	719	4	1	0	0	46	0	0	46
200 Area Groundwater	4*	2	2	0	0	N/A	N/A	N/A	N/A
300 Area Source	251	0	14	0	1	0	0	0	0
300 Area Groundwater	1*	0	1	0	0	N/A	N/A	N/A	N/A
1100 Area Source	31	0	0	0	31	0	0	0	0
Total	1,432	11	55	0	32	285	0	100**	185

*Groundwater assumes one waste site per operable unit.

** Numbers are taken from the Summary of the
Hanford Site Decontamination , Decommissioning and
Cleanup FY 1974-FY 1990.

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Figure 5-4. Land Status.

Table 2-5 (in Section 2.0) identifies land status at the Hanford Site. There are no privately-held lands identified on the Hanford Site. Additionally, in the absence of land use decisions for the Hanford Site, all Hanford lands currently retained by the DOE will continue to be retained in the foreseeable future.

5.6.2.3 Facilities Remediation Status. Figure 5-5 provides a general overview of the planned changes in facility status over time. Like Table 5-2, Figure 5-5 also supports the HQ goal to expeditiously cleanup the Hanford Site through aggressive decommissioning and demolition of contaminated surplus facilities that have no future beneficial use. The data in Figure 5-5 have been grouped into the following categories:

- Operations/transition
- Study/cleanup
- Complete and retained
- Decommissioned, available for transfer.

Figure 5-5 shows the remediation status for transitional and surplus facilities over time. As of FY96, an estimated total of 38 surplus N Reactor facilities are shown in either the operational/transition phase, study/cleanup phase, or the complete/retained phase. Since the EM-40 mission does not include "cleanup for DOE-reuse," Figure 5-5 shows no surplus facilities being

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Figure 5-5. N Reactor Facilities Remediation Status.

decommissioned for possible re-use by RL or by others (i.e., state and federal programs). Figure 5-5 shows an increasing trend towards increased demolition of surplus facilities over the next six years. By the end of FY 2002, an estimated total of 37 surplus facilities assigned to the Richland ER Project will be successfully completed.

5.6.3 Resource Distribution - Strategic Measure #3

In FY 1994, there was a shift in strategy at the Hanford Site from assessment to remediation. Through DOE and stakeholder interactions, the "ER Refocusing" strategy now provides greater emphasis on remedial action activities that have been negotiated into the *Tri-Party Agreement*. Redirection of the Richland ER Project work scope activities supports the ER Refocusing effort. By reducing assessments activities and supporting core activities, the Richland ER Project has been able to free up critical resources for redeployment to remedial action activities. Figure 5-6 shows measurable cleanup progress grouped into the following three categories:

- Remediation
- Assessment
- Core Program

By the end of FY 2002, the funding distribution depicted in Figure 5-6 shows a major decline in required funding needed for assessment and core program activities, and a significant increase in funding available to support remediation and cleanup of the Hanford Site.

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Figure 5-6. Funding Distribution by Category.

5.6.4 Program Efficiency - HQ Strategic Measure #4

By focusing on cost-saving measures, HQ has been very successful in realizing aggressive productivity gains throughout the DOE complex. Reductions in program management and infrastructure costs are key business indicators for measuring and reporting program efficiency and effectiveness (see Figure 5-7).

The reduction of over \$26 million in infrastructure cost reductions in FY96 exemplifies the Richland ER Project's commitment to increase cost effectiveness and efficiency. Program management and infrastructure costs have been reduced to a level that supports the fixed costs for essential services to the project.

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Figure 5-7. Business Indicators.

The Richland ER Project uses three business indicators for measuring and reporting program efficiency:

- **Program Management** - This category includes all of the project control-related activities required to support the Richland ER Project.
- **Infrastructure** - As a complement to program management, this category includes other activities that directly support the project.
- **Other Project Funding** - Major cost savings are also realized through proactive and timely implementation of planned, cost-effective alternatives and approaches to cleanup of the Hanford Site. These include the following:
 - Reducing soil excavation requirements (volumes) to remediate a waste site, based on negotiations with the regulators.
 - Streamlining the cost model based on more thorough constructibility review.

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- Reducing sampling and monitoring requirements, thereby decreasing the number of samples required.
- Reducing the number certification samples required and increasing reliance on field screening.

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE

This section discusses the summary baseline schedule for the Richland ER Project, along with the Long Range Plan Prioritization Logic and a list of compliance milestones.

The Richland ER Project *Long Range Plan (LRP) Interim Study* represents the "top-level" framework for planning, budgeting, managing, and executing the Richland ER Project outyear work scope activities. The LRP is fundamental to Richland ER Project success, because it establishes a balanced "path forward" approach for cleaning up the Hanford Site within fiscal year funding constraints.

6.1 MASTER RESTORATION SCHEDULE

In September 1995, Draft A of the Richland ER Project LRP was issued. The primary objective of the LRP was to lay out a summary-level schedule that was based on realistic fiscal year funding levels that were balanced against completion of the cleanup mission. The Draft A LRP assumed outyear funding levels would remain at around \$150 million, and the LRP forecasted total project completion in FY 2047. As such, Draft A set the stage for establishment of defensible outyear planning assumptions, work scope definitions, and priorities.

In FY96, new planning assumptions required a reassessment of Draft A and a revision to the LRP. Application of revised planning assumptions resulted in significant reductions in total estimated project costs, as well as a nine year acceleration in total project completion. In January 1996 the LRP was updated with revised planning assumptions and, in February 1996, it was reviewed with the Ecology and the EPA. Revised planning assumptions that were incorporated into the *LRP Interim Study* include major reductions in the following areas:

1. Waste volume projections that were prepared for the 100/300 Areas.
2. Analytical cost assumptions (streamlined analytical approach).
3. Costs assumed for remedial action of larger waste sites.
4. Durations planned for groundwater pump and treat operations in the 100/200 Areas.

Programmatic changes resulting from incorporation of these planning assumptions resulted in an estimated nine-year acceleration in the overall Richland ER Project completion schedule. In addition, some work could be started earlier than originally planned in response to requests from EPA and Ecology. Specific subproject results shown in Figure 6-1 include (1) a seven year acceleration in remediation of the 37 high priority sites located in the 100 Area; (2) a ten year

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE

Figure 6-1. Richland Environmental Restoration Project - Long Range Plan.

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acceleration in the remediation of selected 100 and 300 waste sites (excluding 100-N and inaccessible sites in FF-2); and (3) a seven year acceleration of the 100-N waste sites, with all surplus production reactors placed in interim safe storage by FY 2016. Additionally, data from the revised *LRP Interim Study* played a key role in developing the FY97/FY98 priority lists.

The *LRP Interim Study* is the blueprint for successful environmental restoration and cleanup of the Hanford Site. The *LRP Interim Study* outlines the "path forward" course for future budget planning, formulation, and negotiations with HQ, regulators, and stakeholders.

6.2 SIGNIFICANT COMPLIANCE MILESTONES

Table 6-1 lists the TPA compliance milestones assigned to the Richland ER Project, beginning in FY95. Listed below are definitions of the following fields identified in Table 6-1:

DOE-HQ WBS: The Work Breakdown Structure (WBS) used by HQ to track, status, and monitor cleanup activities at the Hanford Site.

RL WBS: The WBS used by RL to track, status, and monitor work scope activities in support of the Hanford Site cleanup mission.

ADS: The Activity Data Sheet (ADS) number assigned to specific work scope items in FY95.

BHI WBS: The WBS used by Bechtel Hanford, Inc. for tracking, status, monitoring, and reporting work scope activities that support cleanup of the Hanford Site.

Type of Milestone: A milestone designation. Since the major regulatory driver for cleanup of the Hanford Site is the *Tri-Party Agreement*, all milestones shown in Table 6-1 are identified as "TPA".

Milestone ID: The milestone identification number assigned to each TPA milestone.

Milestone Description: A brief description of the milestone deliverable.

Baseline Completion Date: The completion date established during *Tri-Party Agreement* negotiations between DOE and the regulators.

Under the *Tri-Party Agreement*, milestone compliance is legally enforceable under CERCLA (Section 310), and is subject to civil penalties under CERCLA Sections 310[c] and 109. Strong legal consequences are anticipated should milestone completions not be completed on schedule.

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE

Over the next seven years, it is expected that Congressional budgetary actions to balance the federal budget will result in a reduced Hanford Site budget. This has the potential to seriously impact the completion of planned cleanup work at the Hanford Site. With Hanford Site funding dependent almost exclusively upon federal funding, the Hanford Site faces a difficult challenge in trying to balance requirements of the *Tri-Party Agreement* against available funding from HQ. During the next ADS planning window (FY98 - FY2002), anticipated target funding is expected to plummet to levels that could compromise timely completion of outyear *Tri-Party Agreement* milestones. Starting as early as FY99, RL could be subject to enforcement actions if progress on some of the *Tri-Party Agreement* milestones assigned to the Richland ER Project fall behind, and if schedules and requirements are not successfully renegotiated with the regulators.

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE**Table 6-1. Tri-Party Agreement Compliance Milestones. (Page 1 of 7)***Note: The legend presented at the end of Table 6-1 identifies all acronyms and terms used in this table.*

DOE-HQ WBS	RL WBS	ADS	BHI WBS	Type	Milestone ID	Milestone Description	Baseline Completion Date
1.4.10.1.1.02	2.1.2	3020	PV	TPA	M-20-00	Submit Part B permit applications of closure/postclosure plans for all RCRA TSD units to regulators	02/28/00
1.4.10.1.1.4.1.1.5	2.1.4.1.10.5	3100	PA115	TPA	M-15-07B	Complete 100-DR-1 treatability study activities	Completed 01/12/95
1.4.10.1.1.4.1.2.5	2.1.4.1.20.5	3100	PA125	TPA	M-15-07I	Submit 100-DR-1 pilot-scale washing test report to regulators	Completed 06/20/95
1.4.10.1.1.4.2.1.4	2.1.4.2.10.4	3100	PA214	TPA	M-15-20A	Submit 100-DR-2 FFS to EPA/Ecology	Completed 06/30/95
1.4.10.1.1.4.2.1.4	2.1.4.2.10.4	3100	PA214	TPA	M-15-20B	Submit 100-DR-2 IRM proposed plan to EPA/ Ecology	Completed 06/30/95
1.4.10.1.1.5.1.1.4	2.1.5.1.10.4	3105	PB114	TPA	M-15-08D	Submit 100-BC-1 FFS to EPA/Ecology	Completed 11/18/94
1.4.10.1.1.5.2.1.4	2.1.5.2.10.4	3105	PB214	TPA	M-15-16E	Submit 100-BC-2 FFS to EPA/Ecology	Completed 06/30/95
1.4.10.1.1.5.2.1.4	2.1.5.2.10.4	3105	PB214	TPA	M-15-16F	Submit 100-BC-2 IRM proposed plan to EPA/ Ecology	Completed 06/30/95
1.4.10.1.1.5.2.1.5	2.1.5.2.10.5	3105	PB215	TPA	M-15-16C	Submit 100-B Area burial ground field work report to EPA/Ecology	Completed 05/04/95
1.4.10.1.1.5.5.1.4	2.1.5.5.10.4	3105	PB514	TPA	M-15-09C	Submit 100-BC-5 FFS to EPA/Ecology	Completed 10/27/94
1.4.10.1.1.5.5.1.4	2.1.5.5.10.4	3105	PB514	TPA	M-15-09D	Submit 100-BC-5 IRM proposed plan to EPA/ Ecology	Completed 10/27/94
1.4.10.1.1.6.2.1.2 1.4.10.1.1.7.2.1.2	2.1.6.2.10.2 2.1.7.1.10.2	3110 3115	PC212 PD212	TPA	M-13-00I	Submit planning documentation necessary to complete the 100-FR-2 and 100-KR-2 RI/FS process	Completed 03/31/95
1.4.10.1.1.6.2.1.2 1.4.10.1.1.6.3.1.2 1.4.10.1.1.7.2.1.2 1.4.10.1.1.8.4.1.2	2.1.6.2.10.2 2.1.6.3.10.2 2.1.7.2.10.2 2.1.8.4.10.2	3110 3115 3120	PC212 PC312 PD212 PE412	TPA	M-15-00A	Complete all remaining 100 OU pre-ROD site investigations under approved work plan schedules (100-KR-2, 100-KR-3, 100-FR-2, 100-IU-2, and 100-IU-6)	12/31/99
1.4.10.1.1.6.1.1.4	2.1.6.1.10.4	3110	PC114	TPA	M-15-10C	Submit 100-KR-1 FFS report and IRM proposed plan to EPA/Ecology	Completed 05/01/95
1.4.10.1.1.6.4.1.4	2.1.6.4.10.4	3110	PC414	TPA	M-15-11C	Submit 100-KR-4 FFS report to EPA/Ecology	Completed 10/27/94
1.4.10.1.1.6.4.1.4	2.1.6.4.10.4	3110	PC414	TPA	M-15-11D	Submit 100-KR-4 IRM proposed plan to EPA/ Ecology	Completed 10/27/94

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE**Table 6-1. Tri-Party Agreement Compliance Milestones. (Page 2 of 7)**

DOE-HQ WBS	RL WBS	ADS	BHI WBS	Type	Milestone ID	Milestone Description	Baseline Completion Date
1.4.10.1.1.6.2.1.4	2.1.6.2.10.4	3110	PC214	TPA	M-15-33A	Submit 100-KR-2 FFS report to EPA/Ecology	Completed 07/31/95
1.4.10.1.1.6.2.1.4	2.1.6.2.10.4	3110	PC214	TPA	M-15-33B	Submit 100-KR-2 IRM proposed plan to EPA/Ecology	12/29/95
1.4.10.1.1.7.1.1.4	2.1.7.1.10.4	3115	PD114	TPA	M-15-13C	Submit 100-FR-1 FFS to EPA/Ecology	Completed 05/30/95
1.4.10.1.1.7.1.1.4	2.1.7.1.10.4	3115	PD114	TPA	M-15-13D	Submit 100-FR-1 IRM proposed plan to EPA/ Ecology	Completed 05/30/95
1.4.10.1.1.7.3.1.4	2.1.7.3.10.4	3115	PD314	TPA	M-15-13G	Submit 100-FR-3 FFS report to EPA/Ecology	12/31/95
1.4.10.1.1.7.3.1.4	2.1.7.3.10.4	3115	PD314	TPA	M-15-13H	Submit 100-FR-3 IRM proposed plan to EPA/ Ecology	12/31/95
1.4.10.1.1.7.4.2.2	2.1.7.4.20.2	3115	PD422	TPA	M-16-82	Submit draft CERCLA expedited response action report for the north slope	Completed 10/31/94
1.4.10.1.1.8.4.1	2.1.8.4.10	3120	PE41	TPA	M-13-00J	Submit planning documentation necessary to complete the 100-IU-2 and 100-IU-6 RI/FS process to regulators	12/31/96
1.4.10.1.1.8.2.1.4	2.1.8.2.10.4	3120	PE214	TPA	M-15-18B	Submit 100-HR-2 FFS to EPA/Ecology	Completed 01/31/95
1.4.10.1.1.8.2.1.4	2.1.8.2.10.4	3120	PE214	TPA	M-15-18C	Submit 100-HR-2 IRM proposed plan to EPA/ Ecology	Completed 01/30/95
1.4.10.1.1.8	2.1.8	3120	PE	TPA	M-15-80	Submit the Columbia River comprehensive impact assessment to the regulators	7/31/96
1.4.10.1.1.9.1.2.1	2.1.9.1.20.1	3125	PG121	TPA	M-16-12	Issue letter, report, and schedules to EPA/Ecology regarding Skyshine	Completed 10/28/94
1.4.10.1.1.9.1.2.1	2.1.9.1.10.1	3125	PG121	TPA	M-16-12-A	Complete implementation of Skyshine abatement action selected under M-16-12	Completed 7/26/95
1.4.10.1.1.9.2.1.1	2.1.9.2.10.1	3125	PG211	TPA	M-16-12E	Submit letter report to EPA/Ecology that evaluates pump-and-treat facility effectiveness (including a need for a barrier wall)	Complete 2/26/96
1.4.10.1.1.9.1.1.2 and 1.4.10.1.1.9.2.1.2	2.1.9.1.10.2 and 2.1.9.2.10.2	3125	PG112 and PG212	TPA	M-13-87	Submit 100-NR-1 and 100-NR-2 RFI/CMS work plans	Completed 10/31/94
1.4.10.1.1.9.1.1.3 and 1.4.10.1.1.9.2.1.3	2.1.9.1.10.3 and 2.1.9.2.10.3	3125	PG113 and PG213	TPA	M-15-12A	Submit LFI report for new work completed under 100-NR-1 and 100-NR-2 RFI/CMS	07/31/96
1.4.10.1.1.9.1.1.1 and 1.4.10.1.1.9.2.1.1	2.1.9.1.10.1 and 2.1.9.2.10.1	3125	PG111 and PG211	TPA	M-15-12B	Submit closure plan/CMS for 1301N/1325N	03/31/97

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE

Table 6-1. Tri-Party Agreement Compliance Milestones. (Page 3 of 7)

DOE-HQ WBS	RL WBS	ADS	BHI WBS	Type	Milestone ID	Milestone Description	Baseline Completion Date
1.4.10.1.1.9.1.1.1 and 1.4.10.1.1.9.2.1.1	2.1.9.1.10.1 and 2.1.9.2.10.1	3125	PG111 and PG211	TPA	M-15-12C	Submit 100-NR-1 and 100-NR-2 CMS to Ecology/EPA for approval	11/30/96
1.4.10.1.1.9.2.2.8	2.1.9.2.20.8	3125	6PG228	TPA	M-16-12B	Complete construction and installation of sheet pile barrier wall at N Springs	TBD 02/28/96
1.4.10.1.1.9.2.4.9	2.1.9.2.40.9	3125	6PG249	TPA	M-16-12C	Submit letter on results of testing the wells	Completed 10/31/94
1.4.10.1.1.9.2.4.9	2.1.9.2.40.9	3125	6PG249	TPA	M-16-12D	Complete construction, installation, and initiate operations of N Springs pump and treat	Completed 9/29/95
1.4.10.1.1.10.11.1	2.1.10.11.10	3200	PLB1	TPA	M-13-00C	Submit six RI/FS or RFI/CMS work plans	Completed 11/21/94
1.4.10.1.1.10.11.1.4	2.1.10.11.10.4	3200	PLB14	TPA	M-13-81A	Submit work plan on the Hanford Site groundwater protection management plan to regulators	Completed 10/28/94
1.4.10.1.1.10.2.1	2.1.10.2.10.	3200	PL21	TPA	M-13-13	Submit one 200 NPL RI/FS (RFI/CMS) work plan to regulators for 200-BP-2	12/31/98
1.4.10.1.1.10.4.1 1.4.10.1.1.11.1.1 1.4.10.1.1.18.1.1	2.1.10.4.10 2.1.11.1.10 2.1.18.1.10	3200 3205 3240	PL41 PM11 PY11	TPA	M-13-00L	Submit three RI/FS (RFI/CMS) work plans to regulators (200-BP-4, 200-IU-1, and 200-NO-1)	12/31/01
1.4.10.1.1.10.3.1 1.4.10.1.1.15.3.1 1.4.10.1.1.15.4.1	2.1.10.3.10 2.1.15.3.10 2.1.15.4.10	3200 3225	PL31 PS31 PS41	TPA	M-13-00M	Submit three RI/FS (RFI/CMS) work plans to regulators (200-BP-3, 200-TP-3, and 200-TP-4)	12/31/02
1.4.10.1.1.10.3.1 1.4.10.1.1.10.9.1 1.4.10.1.1.18.2.1	2.1.10.3.10 2.1.10.9.10 2.1.18.2.1	3200 3240	PL31 PL91 PY21	TPA	M-13-00N	Submit three RI/FS (RFI/CMS) work plans to regulators (200-BP-3, 200-BP-10, and 200-IU-2)	12/31/03
1.4.10.1.1.10.6.1 1.4.10.1.1.13.2.1 1.4.10.1.1.13.3.1 1.4.10.1.1.17.3.1	2.1.10.6.10 2.1.13.2.10 2.1.13.3.10 2.1.17.3.10	3200 3215 3235	PL61 PP21 PP31 PU31	TPA	M-13-00P	Submit four RI/FS (RFI/CMS) work plans to regulators (200-ZP-3, 200-BP-6, 200-RO-2, and 200-RO-3)	12/31/05
1.4.10.1.1.10.7.1 1.4.10.1.1.18.5.1 1.4.10.1.1.19.1.1 1.4.10.1.1.19.2.1	2.1.10.7.10 2.1.18.5.10 2.1.19.1.10 2.1.19.2.10	3200 3240 3245	PL71 PY51 PW11 PW21	TPA	M-13-00Q	Submit four RI/FS (RFI/CMS) work plans to regulators (200-BP-8, 200-SS-1, 200-SS-2, and 200-IU-5)	6/30/06
1.4.10.1.1.10.10.1.2	2.1.10.10.10.2	3200	PLA12	TPA	M-20-36	Submit 216-A-29 ditch and 216-B-63 trench closure/postclosure plans to EPA/Ecology in coordination with the work plan for the 200-BP-11	Completed 04/03/95

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE

Table 6-1. Tri-Party Agreement Compliance Milestones. (Page 4 of 7)

DOE-HQ WBS	RL WBS	ADS	BHI WBS	Type	Milestone ID	Milestone Description	Baseline Completion Date
1.4.10.1.1.10.11.1.5	2.1.10.11.10.5	3200	PLB15	TPA	M-15-81A	Submit to EPA/Ecology a document to coordinate regulatory compliance decisions across RARA and CERCLA groundwater monitoring programs for the 200 Area plateau	Completed 12/21/95
1.4.10.1.1.10.11.1.5	2.1.10.11.10.5	3200	PLB15	TPA	M-15-81B	Submit to EPA/Ecology a document to support future feasibility studies describing the known nature and extent of Iodine-129 contamination in the 200 Area Plateau	Completed 10/12/95
1.4.10.1.1.12.2.1.2	2.1.12.2.10.2	3210	PN212	TPA	M-13-11	Submit 200-PO-2 RFI/CMS, closure/post closure work plan to regulators	6/30/98
1.4.10.1.1.12.3.1	2.1.12.3.10	3210	PN31	TPA	M-13-12	Submit 200-PO-4 RFI/CMS closure/postclosure work plan to regulators	10/31/98
1.4.10.1.1.12.4.1	2.1.12.4.10	3210	PN41	TPA	M-13-16	Submit 200-PO-5 RFI/CMS closure/postclosure work plan to regulators	10/31/99
1.4.10.1.1.12.5.1 1.4.10.1.1.17.2.1	2.1.12.5.10 2.1.17.2.10	3210 3235	PN51 PU21	TPA	M-13-00K	Submit two RI/FS (RFI/CMS) work plans to regulators (200-PO-6, 200-ZP-2)	12/31/00
1.4.10.1.1.12.1.1.2	2.1.12.1.10.2	3210	PN112	TPA	M-15-25	Submit 200-PO-1 RARA field investigation (RFI) report to EPA/Ecology	Completed 12/21/95
1.4.10.1.1.12.1.1.2	2.1.12.1.10.2	3210	PN112	TPA	M-15-25A	Submit 200-PO-1 CMS to EPA/Ecology	7/31/96
1.4.10.1.1.12.1.1.2	2.1.12.1.10.2	3210	PN112	TPA	M-15-25B	Submit 200-PO-1 permit modifications to EPA/Ecology	8/30/96
1.4.10.1.1.12.3.1	2.1.12.3.10	3210	PN31	TPA	M-20-52	Submit 216-A-37-1 Crib closure/postclosure plan to regulators in coordination with the 200-PO-4 work plan	10/31/98
1.4.10.1.1.12.4.1	2.1.12.4.10	3210	PN41	TPA	M-20-53	Submit 207-A retention basin closure postclosure plan in coordination with the 200-PO-5 work plan	10/31/99
1.4.10.1.1.12.2.1	2.1.12.2.10	3210	PN21	TPA	M-20-33	Submit 216-A-10 Crib and 216-A-36B Crib closure/postclosure plan to regulators in coordination with the 200-PO-2 work plan	6/30/98
1.4.10.1.1.13.1.1	2.1.13.1.10	3215	PP11	TPA	M-13-15	Submit 200-RO-1 RFI/CMS, closure/post closure work plan to regulators	6/30/99

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE**Table 6-1. Tri-Party Agreement Compliance Milestones. (Page 5 of 7)**

DOE-HQ WBS	RL WBS	ADS	BHI WBS	Type	Milestone ID	Milestone Description	Baseline Completion Date
1.4.10.1.1.13.1.1	2.1.13.1.10	3215	PP11	TPA	M-20-39	Submit 216-S-10 Pond and Ditch closure plan/ postclosure plan to regulators in coordination with the 200-RO-1 work plan	6/30/99
1.4.10.1.1.14.1.1	2.1.14.1.10	3220	PR11	TPA	M-13-17	Submit 200-SO-1 RFI/CMS, closure/postclosure work plan to regulators	2/28/00
1.4.10.1.1.14.1.1	2.1.14.1.10	3220	PR11	TPA	M-20-54	Submit 241-CX Tank system closure/post closure plan to regulators in coordination with the 200-SO-1 work plan	2/28/00
1.4.10.1.1.15.1.1 1.4.10.1.1.15.2.1 1.4.10.1.1.18.6.1	2.1.15.1.10 2.1.15.2.10 2.1.18.6.10	3225 3240	PS11 PS21 PY61	TPA	M-13-000	Submit three RI/FS (RFI/CMS) work plans to regulators (200-IU-6, 200-TP-1, and 200-TP-2)	12/31/04
1.4.10.1.1.16.2.1.4	2.1.16.2.10.4	3230	PT214	TPA	M-15-15E	Issue final draft 200-UP-2 LFI and FFS reports to regulators	12/31/96
1.4.10.1.1.16.1.2.3	2.1.16.1.20.3	3230	PT123	TPA	M-15-17	Submit proposed IRM plan for the uranium, technetium-99, and nitrate plume (200-UP-1) to EPA/Ecology	Completed 4/07/95
1.4.10.1.1.16.2.1.3	2.1.16.2.10.3	3230	PT213	TPA	M-15-15B	Submit the draft 200-UP-2 LFI report to EPA/Ecology	Completed 06/27/95
1.4.10.1.1.16.2.1.3	2.1.16.2.10.3	3230	PT213	TPA	M-20-37	Submit the 216-U-12 Crib closure/postclosure plan to EPA/Ecology in coordination with the 200-UP-2 LFI report	Completed 06/27/95
1.4.10.1.1.16.2.1.4	2.1.16.2.10.4	3230	PT214	TPA	M-15-15C	Submit the draft 200-UP-2 FFS report to EPA/Ecology	04/30/96
1.4.10.1.1.16.2.1.4	2.1.16.2.10.4	3230	PT214	TPA	M-15-15D	Submit the draft 200-UP-2 IRM proposed plan to EPA/Ecology	04/30/96
1.4.10.1.1.18.3.1	2.1.18.3.10	3240	PY31	TPA	M-13-14	Submit 200-IU-3 RFI/CMS, closure/post closure work plan to regulators	2/28/99
1.4.10.1.1.22.2.1.2	2.1.22.2.10.2	3300	P2212	TPA	M-13-08	Issue LFI work plan for the 300-FF-2 to EPA/Ecology	Completed 11/21/94
1.4.10.1.1.22.5.1.4	2.1.22.5.10.4	3300	P2514	TPA	M-15-04B/C	Submit 300-FF-5 draft combined Phase 2 RI and Phase 3 FS report to EPA/Ecology	Completed 01/18/95
1.4.10.1.1.22	2.1.22	3300	P2	TPA	M-15-00B	Complete all 300 Area OU pre-ROD site investigations under approved work plan schedules	12/31/99
1.4.10.1.1.22	2.1.22	3300	P2	TPA	M-16-03A	Establish date for completion of all 300 Area remedial actions	6/30/02
1.4.10.1.1.22	2.1.22	3300	P2	TPA	M-16-00B	Complete all 300 Area remedial actions	TBD

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE**Table 6-1. Tri-Party Agreement Compliance Milestones. (Page 6 of 7)**

DOE-HQ WBS	RL WBS	ADS	BHI WBS	Type	Milestone ID	Milestone Description	Baseline Completion Date
1.4.10.1.1.23	2.1.23	3390	P3	TPA	M-16-05A	Submit construction completion reports for the remaining 1100 Area OUs	Completed 12/21/95
1.4.10.1.1.23.6.2.6	2.1.23.6.20.6	3390	P3626	TPA	M-16-81	Submit draft CERCLA construction completion report for the entire ALE Reserve	Completed 10/31/94
1.4.10.1.2.2	2.2.2	3510	UB	TPA	M-16-01-A	Submit necessary 100 N Area D&D/NEPA documentation for public review	6/30/97
1.4.10.1.2.2	2.2.2	3510	UB	TPA	M-16-01B	Complete negotiation of 100 N Area D&D work schedule	6 mo. after EIS/ROD
1.4.10.1.2.5.1.1.1	2.2.5.1.10.1	3600	UN111	TPA	M-15-12D	Submit 100 N area pilot project management plan to EPA/Ecology for concurrence	Completed 03/16/95
1.4.10.1.2.5.1.1.1	2.2.5.1.10.1	3600	UN111	TPA	M-16-01	Complete 100N Area D&D	TBD
1.4.10.1.2.5.1.1.1	2.2.5.1.10.1	3600	UN111	TPA	M-16-01E	Complete N Reactor/100 N Area deactivation pursuant to the work scope in the <i>N Reactor Deactivation Program Plan</i> (WHC 1993)	9/30/97
1.4.10.1.2.5.1.1.1	2.2.5.1.10.1	3600	UN111	TPA	M-16-12F	Complete dose reductions activities at the Columbia River shoreline by decontamination of 1304-N emergency dump tank	Completed 9/29/95
1.4.10.1.6.1.1.1.4	2.5.1.1.20.4	3700	CF114	TPA	M-70-00	ERDF to be operational on September 30, 1996	09/30/96
1.4.10.1.1	2.1	N/A	P	TPA	M-15-00	Complete the RI/FS (or RFI/CMS) process for all OUs	12/31/08
1.4.10.1.1	2.1	N/A	P	TPA	M-15-00C	Complete all 200 Area non-tank farm OUs pre-ROD site investigations under work plan schedules	12/31/08
1.4.10.1.1	2.1	N/A	P	TPA	M-16-00	Complete all remedial actions for all non-tank farm OUs and D&D for 100 Area buildings (except 105-B, C, D, DR, F, H, KE, KW, and N Reactor)	9/30/18

6.0 ENVIRONMENTAL RESTORATION PROJECT MASTER SCHEDULE

Table 6-1. Tri-Party Agreement Compliance Milestones. (Page 7 of 7)

DOE-HQ WBS	RL WBS	ADS	BHI WBS	Type	Milestone ID	Milestone Description	Baseline Completion Date
1.4.10.1.1	2.1	N/A	P	TPA	M-16-00A	Complete all 100 Area remedial actions	TBD
1.4.10.1.1	2.1	N/A	P	TPA	M-16-00F	Establish date for completion of all 100 Area remedial actions	12/31/01

ADS = Activity Data Sheet
 AIP = Agreement-in-principle
 ALE = Arid Lands Ecology
 CAMU = Corrective Action Management Unit
 CERCLA = *Comprehensive Environmental Response Compensation and Liability Act of 1980*
 CMS = Corrective measures study
 D&D = Decontamination and decommissioning
 DOE-HQ = U.S. Department of Energy-Headquarters
 Ecology = Washington State Department of Ecology
 EIS = Environmental Impact Statement
 EPA = U.S. Environmental Protection Agency
 ERDF = Environmental Restoration Disposal Facility

FFS = Focused feasibility study
 IRM = Interim remedial measures
 LFI = Limited field investigation
 NEPA = *National Environmental Policy Act of 1969*
 NPL = National Priorities List
 OU = Operable unit
 QSR = Quality System Requirements
 RCRA = *Resource Conservation and Recovery Act of 1976*
 RI/FS = Remedial investigation/feasibility study
 RFI/CMS = RCRA facility investigation/corrective measures study
 ROD = Record of Decision
 TSD = Treatment, storage, and disposal
 WBS = Work breakdown structure

7.0 ISSUES AND INITIATIVES

This section summarizes the key issues that are affecting the Richland ER Project's performance, including the lack of a determination for final land use options, conflicts between current Tri-Party Agreement requirements and the proposed long-term remediation strategy, integration of RCRA/CERCLA requirements, and undefined burial ground and groundwater strategies. Initiatives that have been implemented successfully within the environmental restoration project are identified, including a bias-for-action approach, implementation of performance objectives criteria, integration of technology development in field scenarios, and a summary of FY95 cost savings generated by the Richland ER Project.

7.1 KEY ISSUES AFFECTING THE RICHLAND ENVIRONMENTAL RESTORATION PROJECT

Several key issues presently affect implementation of the environmental remediation strategy at the Hanford Site. Each issue is identified below, along with its potential impact upon the ER program, and the actions that are being taken to resolve each issue.

7.1.1 Lack of Determination of Final Land Use Decisions at the Hanford Site

The lack of a final land use decision is a major impediment in completing the ER planning mission. Regulatory actions outside of the Richland ER Project that are necessary for resolution of future land use decisions have not yet been completed (see Section 2.6). This inhibits planning for the total remedial effort. Since there has been no preclusion of land use at this point for most areas of the Hanford Site, the program must default (for planning purposes) to the most conservative standard so as not to preclude any future land use option. The ROD issued for 100 Area interim action contains a land use determination that does not preclude any future use. A proposed plan for the 300 Area has been issued for public comment, with a land use designation of "industrial," and public comments have not been supportive of this designation. Therefore, land use remains an open issue pending further review.

The impacts of this unresolved issue are both technical and budgetary. Remediation cleanup standards have a direct correlation with the proposed land use at a site. When the land use is undetermined, a conservative approach is usually taken in program planning, so as not to preclude any future use. Such a determination increases project costs significantly, since the remediation standards for this designation are much more stringent than for industrial or other land use categories.

7.0 ISSUES AND INITIATIVES

Actions are being taken to establish final land use decisions for the Hanford Site. A draft HRA-EIS is currently being prepared, and is currently scheduled for public review during the second quarter of FY96. In addition to the HRA-EIS, a CLUP is being prepared for the Hanford Site. This is scheduled for a comment cycle during the FY96 second quarter (see Section 2.6).

7.1.2 Natural Resource Assessments

Natural resource assessments are a part of the CERCLA process, under Section 107. RL is both a trustee and the lead agency for these assessments at the Hanford Site. However, there are also other entities who (by law) are site trustees. CERCLA establishes certain liabilities for natural resource damages to the Hanford Site. The impact of this liability to the ER program could be significant, since potential damages could reach into the millions of dollars (if assessed).

The Richland ER Project is resolving this issue by proactively integrating natural resource values and requirements into the remedial action process. RL has established the Natural Resources Trustee Council and meets monthly with these trustees. The objectives of these meetings include ensuring that natural resource values are fully integrated with Hanford Site decision-making, encouraging the development of site-wide natural resource management planning, and establishing good stewardship principles.

7.1.3 Disconnect Between Binding Agreements in the Tri-Party Agreement and the Long-Term Remediation Strategy

The *Tri-Party Agreement* is the legally enforceable regulatory driver for current remedial activities at the Hanford Site. However, the proposed long-term remedial strategy for the Richland ER Project and the current *Tri-Party Agreement* are not in agreement. Current and future strategies must account for continuing budgetary reductions, while the *Tri-Party Agreement* (when originally drafted) only assessed regulatory requirements for remediation without regard to cost. If the proposed long-term strategy is implemented, there are binding milestones/commitments in the current *Tri-Party Agreement* that will not be met.

The impacts of not meeting these milestones would be serious, and could lead to stipulated penalties and/or citizen enforcement lawsuits. In order to implement the more effective and cost efficient remedial actions proposed in the long-term strategy, a major renegotiation of the *Tri-Party Agreement* must occur. Without regulator concurrence, the *Tri-Party Agreement* cannot be amended. If the *Tri-Party Agreement* cannot be renegotiated to reflect the proposed strategy, cost impacts to the Richland ER Project increase significantly.

The Richland ER Project is resolving this issue in 1996 by entering into negotiations with the regulators that will result in *Tri-Party Agreement* amendments reflecting the proposed strategy.

7.0 ISSUES AND INITIATIVES

7.1.4 Radioactive Contamination Assessment/Cleanup/Remediation Standards

A common problem exists for all DOE facilities in that there is no single set of cleanup standards that have been established for radioactive contamination. Due to the extent of contamination and the open working relationship with state and federal regulatory agencies, the Richland ER Project has been able to negotiate with the regulators on a site-by-site basis to establish mutually acceptable standards for remediation of these sites. These results have paved the way for similar accomplishments at other sites within the DOE complex.

The impact of this issue is a potential schedule delay if mutually acceptable standards are not negotiated in a timely manner.

The Richland ER Project will maintain an active role in establishing standards for remediation of radioactive contamination.

7.1.5 Burial Ground Strategy

Burial ground activities are currently on hold pending development of a burial ground strategy that will minimize the amount of required remediation. The burial ground activities have been addressed through the assessment phase but, prior to the initiation of remediation, a single ROD for the 100 Area burial grounds is needed.

The initial ROD for the 100 Area Liquid Waste Disposal Sites prescribes a remedial technology of remove, treat (as appropriate), and dispose. However, unlike the liquid waste sites, the burial grounds are not expected to contain mobile contaminants that could threaten the surrounding environment. Their primary risks are associated with potential future inadvertent exposures to human receptors.

The cost to remove the burial grounds could amount to hundreds of millions of dollars more than in-place remedial alternatives. Unfortunately, due to the burial grounds' heterogeneous content (and lack of complete characterization data), it is difficult to identify the specific burial grounds that may be viable candidates for in-place remedial technologies. It may also cost more to obtain sufficient characterization data than defaulting to a removal technology.

A team has been assembled to prepare a comprehensive burial ground strategy. The burial ground strategy is currently in the development phase, and is scheduled to be issued by the end of FY96. Although the burial grounds are not currently in the Richland ER Project planning window, this strategy could have a major effect on project priorities.

7.0 ISSUES AND INITIATIVES

7.1.6 Disposal of Contaminated Glove Boxes for D&D and Facility Transition

Plutonium-contaminated gloveboxes exist in many 200 and 300 Area facilities that are (or will be) deactivated in the next ten years. (There are already several in long-range storage in two Richland ER Project buildings.) All gloveboxes, active or deactivated, require special actions. The general size, configuration, and levels of contamination of the boxes make conventional dismantlement unlikely. Packaging and long term management as transuranic (TRU) waste is also an unresolved issue. Disposition of these glove boxes may be hampered by regulatory and technological constraints, including the opening of the Waste Isolation Pilot Plant (WIPP) in New Mexico.

The Richland ER Project is currently evaluating existing and innovative technologies to resolve this issue. The project is also discussing this concern with representatives of appropriate on-site organizations.

7.1.7 Groundwater Strategy

The current groundwater strategy does not currently have a decision-making process that adequately addresses groundwater issues. Without this process, implementation of containment measures and mass reduction of groundwater contamination plumes will be unsuccessful. The strategy is being revised to address both long- and short-term concerns. This revision will focus on the following:

- 1) Preparation of a technical supporting document containing summaries of pertinent technical information derived from previously published and unpublished sources.
- 2) Performance of additional modeling studies and engineering calculations to predict movement of plume contaminants at 50, 100, and 200 year periods for each of the major Hanford Site plumes. (Cases will be evaluated for both no action and active remediation scenarios.) This task includes direct measurement of groundwater pore velocities (in up to 40 wells) to provide data for the modeling efforts.
- 3) Preparation of a decision analysis document that includes development of a decision tree and decision criteria for investigation and remediation activities leading to final remedial action decisions.
- 4) Preparation of a site-wide groundwater monitoring strategy that supports short- and long-term monitoring programs. The strategy will integrate the groundwater monitoring efforts that are currently being performed under three separate programs.

7.0 ISSUES AND INITIATIVES

These actions will provide a cost effective approach to groundwater remedial actions by focusing efforts on the need for monitoring and re-evaluation, instead of continuing the existing duplicative programs.

7.1.8 Risk Designation Process

Two key issues have been identified during the risk designation process. The first is that the risk equation used in the MAP does not include certain key environmental criteria (such as groundwater contamination, groundwater impacts to surface water, and non-human receptors.) The second issue is that the overall MAP does not sufficiently account for non-technical factors at the Hanford Site, such as compliance issues related to the *Tri-Party Agreement*, as well as stakeholder/trustee interests and rights.

These factors show how the results of the risk evaluation process do not accurately reflect the complexity of extrinsic factors affecting priorities at the Hanford Site.

7.2 INITIATIVES IMPLEMENTED TO IMPROVE PROJECT PERFORMANCE

The Richland ER Project is sponsoring a number of innovative initiatives to enhance project performance. These initiatives, which are listed below, will result in significant improvement in programmatic, technical, cost, and schedule areas of project performance.

7.2.1 Bias-For-Action Approach

The Richland ER Project has established an effective bias-for-action in its approach to Hanford Site remediation by using an observational approach to site characterization. Less time and budget is expended upon the detailed characterization of each OU, thereby allowing for flexibility in the remedial process based on results of actual, in-progress remediation activities. Safety, which is the Richland ER Project's number one priority, is fully supported so that worker exposure to hazardous and radioactive materials is minimal. The observational approach may arguably lead to less precise site characterization, with uncertainty in estimating waste volumes and remediation costs. However, this uncertainty is considerably offset by the effective application of innovative field measurement and evaluation techniques to perform rapid, integrated site characterization analysis.

7.2.2 The Tri-Party Agreement

The *Tri-Party Agreement* is a binding, legally enforceable document signed by DOE, the EPA, and Ecology. It is also viewed by all parties as a dynamic, living document. Unlike standard consent orders, negotiated modification of the *Tri-Party Agreement* is not only possible but has

7.0 ISSUES AND INITIATIVES

actually taken place throughout the years to include the 1995 "refocusing" effort. The *Tri-Party Agreement* provides the framework for active input from all parties, and reflects and sustains DOE's commitment to the environmental remediation of the Hanford Site.

7.2.3 NEPA/CERCLA Integration

An extremely effective and successful Richland ER Project initiative involves the adoption of an approach to routinely incorporate NEPA values into CERCLA documentation. By implementing overlapping requirements, this process avoids costly multiple review processes and duplication of documentation and analyses. This innovative initiative fosters the effective and efficient allocation of limited resources.

7.2.4 Proposed Use of the CERCLA Process to Define Site-Specific Requirements

The CERCLA process mandates identification of ARARs for the performance of environmental remediation. DOE is committed to using the CERCLA/*Tri-Party Agreement* process for the environmental restoration of the Hanford Site. A proposal is in place to significantly streamline the regulatory framework by using the CERCLA/*Tri-Party Agreement* process to ensure that environmental, safety, and health requirements are identified and appropriately applied to project activities. The CERCLA/*Tri-Party Agreement* process will be used to fulfill substantive requirements that would otherwise be met by DOE orders. This regulatory streamlining will result in a significant potential cost saving over the life of the project.

7.2.5 Contracting Strategy

The primary productivity and cost savings initiative on the Richland ER Project was initiated by DOE, through a contracting strategy to establish a contract comparable to the commercial sector rather than one typically associated with a traditional M&O contract.

DOE recognized that previous contracting methods common to DOE sites, particularly the M&O approach, required change. This change incorporates a performance-based contractual approach that rewards the contractor based on pre-established performance criteria that are linked to project goals and objectives. Prime contractors are encouraged to develop and utilize a "best in class" approach, as well as other commercial practices, for more efficient subcontracting.

7.2.6 Richland ER Project Subcontracting Strategy

A major change has been made towards fixed price, lump sum, or incentive contracting. Change is being accomplished through deployment of procurement resources to individual work projects in order to assist engineering and other groups in developing clear, concise work scopes that allow for securing competitive bids on a fixed price or lump sum basis. This early involvement

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in teamwork also allows for identification of discreet work scopes that can be subcontracted. A list of prequalified firms has been established for performance of work. Once new work is identified, the scopes are bid competitively among three or more of the prequalified subcontractors. Small, small disadvantaged, and woman-owned businesses are given a maximum opportunity to compete.

The Richland ER Project subcontracted its well drilling operations in FY95. As a result of this competitive procurement, well drilling costs have been significantly reduced. Well drilling costs are only incurred when drilling operations are underway. Subcontracts were awarded to two companies on a firm, fixed-price, indefinite delivery order, unit priced basis. At the time of the award a subcontracting package was signed by both subcontractors. Thus, when well drilling services are needed, each subcontractor is given the opportunity to bid on the specific job order. Since it only necessary then to issue a job order to the successful bidder, drilling can begin almost immediately. Costs for these services are captured and provided to the project managers as a planning tool to help identify savings opportunities by minimizing standby time, mobilization, or other cost elements.

Another acquisition process to streamline the purchase of non-critical (safety-related) goods includes implementation of procurement credit cards to reduce cycle times, administrative costs, and reviews of blanket-type purchase orders when heavy usage is anticipated.

7.2.7 Incentive Share Proposals

One of the objectives of the Richland ER Project is to identify and apply approaches and techniques that will reduce the cost of an individual project or that will accelerate the final disposal of facilities, which further reduces the total cost of the Richland ER Project. As a means of ensuring that this objective is addressed, and that the most cost-effective technical methods are being applied to projects, RL encourages the prime contractor to propose incentivized, cost sharing proposals for performing individual projects. Under the provisions of an incentive share project, DOE and the prime contractor mutually share in cost savings that result from the execution of a project when the project is completed for less than an agreed upon target cost. The negotiated target cost is based upon a cost estimate prepared by the prime contractor that is reconciled with an independently determined cost estimate obtained by RL. The shared cost savings are the result of the prime contractor applying new innovative approaches, techniques, or methods to the project, and by utilizing aggressive and safe workmanship to complete the agreed upon work scope for less cost than the agreed upon target.

7.0 ISSUES AND INITIATIVES

7.2.8 Performance Objective Criteria (POC)

The ERC Performance Objective Criteria (POC) are established by RL for each six-month evaluation period. The POC provide an incentive for outstanding performance, and establish specific measurable objectives for evaluating performance.

The POC are not intended to cover every aspect of Richland ER Project performance. The POC identify major areas where DOE wants to achieve outstanding performance. If, during the performance period, a significant success or problem is identified that is not addressed in a specific POC, the Fee Determination Official may consider this factor in evaluating overall performance.

7.2.9 Business Management Quality Improvement Team

In February 1995 RL, in conjunction with the ERC, established a joint business quality improvement team (BQIT) that encourages employees to offer suggestions on reducing the cost of doing business within the Richland ER Project. The BQIT process involves the following responsibilities and activities:

- Serving as the focal point for the Richland ER Project for all business management initiatives that reduce costs and increase efficiencies.
- Screening and evaluating proposed initiatives.
- Assigning members as champions, where appropriate, to support specific cost reduction or efficiency initiatives brought to the BQIT.
- Serving on subcommittees and helping to gather, review, analyze, and evaluate specific cost reduction or efficiency initiatives.
- Evaluating and recommending improvements to the Results Management Team (RMT).
- Tracking and reporting the initiatives undertaken to reduce costs or increase efficiencies.
- Issuing monthly reports (through the RMT) regarding the disposition of initiatives and the dollar value of savings and efficiencies.

The BQIT has processed 207 proposed initiatives since it was formed. Of these, the review and evaluation has been completed for 106, with 81 initiatives implemented. For the period of October 1994 - February 1996, the cost savings realized from implementation of initiatives has been approximately \$56 million. Of the remaining 101 suggestions still in review, a potential savings of nearly \$3 million has been estimated.

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7.2.10 Data Quality Objective Process

The Richland ER Project has established a systematic planning tool to assure adequate data collection to support environmental restoration decisions. Facilitators experienced in the EPA DQO process are used to lead Hanford Site stakeholders and decision makers through the process. The DQO process consists of three phases: 1) evaluating data and developing a site conceptual model; 2) identifying and resolving regulatory issues; and 3) applying the EPA seven step process. The DQO process is used as a means to put actions in priority order, ensure data collection is statistically based, manage uncertainty, focus decision making, and reduce costs.

7.2.11 ERDF Savings from Life-Cycle Planning for Wastes

RL has created a planning base to achieve significant savings for waste management. For the ERDF, which is a CERCLA landfill for Hanford Site remediation wastes, several major cost reduction strategies have been developed. These include the following:

- Bulk handling and transfer will be employed to dispose of contaminated soil and concrete. This economy-of-scale approach to restructuring Hanford Site work will eliminate high labor and container costs associated with commonly employed Department of Transportation (DOT) transportation and disposal containers. Much of the million cubic yard volume of waste of the first cell of ERDF will be excavated, transported, and disposed using economical bulk handling methods. This simple approach will reduce disposal costs by 90-95 percent. Disposal costs are anticipated to be lower or equal to simple municipal waste disposal costs. In addition, bulk disposal will increase the functional capacity of the facility because there will not be void spaces between containers.
- Waste designation and acceptance criteria will be based on an innovative gross "waste profile" approach. Using existing process knowledge, field screening methods, and minimal fixed laboratory analyses, a waste profile will be generated prior to shipping waste. Additional quality control measurements and analyses will be conducted to verify analyses. In addition, waste analyses will be conducted using methods that set detection limits appropriate to the ceiling limits for contaminants. These decreased requirements for accuracy will permit the use of cheaper, faster, and more appropriate analytical methods.

RL is rapidly and economically constructing the ERDF using competitive commercial sourcing to construct the disposal unit. RL has also contracted for an operating subcontractor for the ERDF. This will minimize labor and management costs.

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7.2.12 Benchmarking Program

The Richland ER Project has established a benchmarking program, in which internal practices, processes, and methods are measured and compared with those of leading organizations. Benchmarking studies provide a way to compare performance of the benchmarked processes among other participating companies and organizations. A description of the project's gap in performance (as compared to the identified performance levels) and performance goals for the benchmarked processes also result. These outputs are used to improve project performance. Processes currently undergoing benchmarking include automation technology, human resources, site-wide communications, and procurement.

7.2.13 Productivity and Cost Savings Program

Productivity and cost savings, including those developed through the BQIT, are documented through the change control process. Baseline change proposals (BCPs) describe and justify each initiative for RL management. The completed BCPs are then audited by an accounting firm to validate the productivity and cost savings.

The productivity and cost savings initiatives implemented during FY95 are summarized in Table 7-1.

7.2.14 Communicating Project Progress

RL developed a communications plan to create and maintain a high level of awareness and understanding (by the public and policy makers) of the achievements of the Richland ER Project. This plan encourages public and policy makers to actively participate in important Richland ER Project decision making processes.

An aggressive program is now in place to distribute information to Hanford Site employees, the public, and policy makers. Articles on ER program projects are regularly published in the Hanford Site newspaper (the *Hanford Reach*). Major projects are highlighted in news releases and media events. Recent examples were the implosion of the 190-D pumphouse facility (see Figure 7-1) and the completion of the initial ERDF construction phase. The community relations department, together with RL, developed an annual report that highlights the major ER projects completed during FY95. The department regularly prepares high level briefing presentations that give regulators and policy makers an understanding of the current state of the ER program. In addition, an electronic Home Page has been developed utilizing Netscape, and current information on projects is available through this electronic means to DOE and regulators. Work is underway to develop a Richland ER Project speakers bureau that will provide the public with an understanding of how successful ER activities are benefitting the public by reducing risks, reducing costs, and returning resources back to the public.

7.0 ISSUES AND INITIATIVES**Table 7-1. FY95 Productivity/Cost Savings. (Page 1 of 2)**

ADS	Title	Summary	\$ (M)
3010	RARA/UST	UST Program Completion during FY94 Optimized performance resulted in an accelerated schedule with program completion during FY94 for FY95 budgeted work.	\$.5
3020	RCRA Closures	183-H Cleanup/Sampling Cost Savings Cost savings resulted from using in-house HAMTC labor versus subcontractors for cleanup of the basins. Additional savings were realized due to reclassifying rain water within the basins as low-level waste instead of listed waste.	\$ 1.2
3020	RCRA Closures	183-H Solar Basins Cost Savings As a result of competitive bidding, cost savings were realized in the decontamination contractor selection.	\$.5
3100/3200	Groundwater	Groundwater Monitoring Program Evaluation Re-evaluation of the entire groundwater monitoring program resulted in a more efficient approach for sample collection, analysis, and validation.	\$ 1.1
3105	100-BC	118-B-1 Excavation Treatability Cost Savings Process improvements for the excavation and sorting of waste in trenches 3 through 5 resulted in cost savings.	\$.5
3120	100-HR	100-HR-3 Pump & Treat Cost Savings Operational efficiencies implemented during the phase 1 and phase 2 treatability tests resulted in cost savings.	\$.6
3125	100-NR	100-NR Operable Unit Cost Savings Cost savings were related to the subcontracting of work scope for the N-Springs pump & treat system installation, the NR-1 crib characterization drilling, and the demobilization of the N-Springs barrier wall.	\$ 1.4
3200	200-BP	200 NPL Common Cost Efficiency Savings Cost savings were due to work efficiencies and the utilization of existing documents for the preparation of the groundwater and Iodine-129 reports.	\$.5
3230	200-ZP	200-ZP-1 Cost Savings Cost savings were due to the elimination of secondary containment for the pump & treat system, elimination of 24 hour operation of the treatability test system, and a reduction in the number of wells requiring groundwater sampling and analysis.	\$.6
3400	Program Management	Price Anderson Amendment Act Cost Savings Cost savings were anticipated from productivity improvements in the codification of five DOE orders during the current fiscal year.	\$.6
3400	Program Management	Simplified Method of Revising QSR Cost Savings	\$.5

7.0 ISSUES AND INITIATIVES**Table 7-1. FY95 Productivity/Cost Savings. (Page 2 of 2)**

ADS	Title	Summary	\$ (M)
3510	100 Area D&D	Facilities Cost Savings Cost savings were due to a decrease in furniture, equipment, and personnel moves as a result of the 1995 reduction in forces.	\$ 1.3
3510	100 Area D&D	100-D Island Cleanup A characterization study and statistical analysis were completed demonstrating that there is no significant risk to the public from D-Island. The regulators concurred.	\$ 1.3
3510	100 Area D&D	105-F & 105-H Roof Repair Cost Savings Significant cost savings are expected from the competitive bid process.	\$.5
3600	N Reactor	Staffing and Simplification of Job Control System Cost savings through cost reductions in staffing, simplification of job control system requirements, reductions in overtime, reductions in occupancy expense requirements, and sample analysis costs were identified.	\$ 2.5
3700	ERDF	Trench W-025A Cost Savings Favorable winter weather conditions led to cost savings from improved subcontractor performance and early project completion.	\$ 4.5
3700	ERDF	Size Re-evaluation The Environmental Restoration Disposal Facility was re-evaluated to determine the size of facility required for an October 1, 1996, start of operation. As a result, only two cells versus the planned 10 cells were constructed. Original ERDF savings were reported as \$11.2M in FY95 and \$70M for the 5 year period. Currently anticipated savings are \$13.3M for FY95 and \$70M for the 5 year period.	\$ 13.3
All	ERC-Wide	Reduction of Distributable Rates Incorporation of lower distributable rates are a direct result of the efficiencies gained by using a FAR contracting method versus the M&O contract method.	\$ 11.6
All	ERC-Wide	Reduced Labor Costs for Automation Technology Utilization of low maintenance computer networks, server based software, and subcontracted printer repairs and software development has reduced the staffing needs for Automated Technology support.	\$ 1.1
3xxx	Various ADSs	Miscellaneous (other savings under \$0.5M)	\$ 5.6
	Total	Richland ER Project Productivity/Cost Savings	\$ 49.7

7.0 ISSUES AND INITIATIVES

Figure 7-1. Demolition of 190-D Facility.

Decontamination and Decommissioning

work was best exemplified by the implosion of the 190 D Pumphouse facility, located adjacent to Hanford's D Reactor. An

innovative salvage contract enabled the 2300 tons of steel and other materials to be sold to an offsite contractor, reducing overall project costs.

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7.0 ISSUES AND INITIATIVES

7.2.15 Managing Human Resources

7.2.15.1 Improving the management of our people as human resources. The Richland ER Project is proactive in educating employees in the use of best commercial practices for work activities. Training for employees is identified and completed as required by the individual's assigned duties and responsibilities, and as detailed in the individual training position descriptions. Employees are encouraged to communicate openly with their supervisors and coworkers about work-related issues, and to utilize the published Employee Concerns Program. A project-wide job posting system is in place, and new positions within the Richland ER Project are available to all interested and qualified employees.

7.2.15.2 Improving the processes involved in managing the Human Resources function. The Richland ER Project has established a training database that captures, tracks, and reports training requirements, course completion, and recertification information for employees. This database provides on-line information to functional and project managers and supervisors.

The Richland ER Project is automating a number of reports (absence, benefits, etc.) that were previously calculated and prepared manually. Forms (employment requisitions, performance reviews, etc.) have already been automated and are available to managers on-line. The Richland ER Project is also establishing a job information system that will enable callers to review a current listing of available positions over the phone.

7.2.16 Streamlining the Administrative Process

Several administrative process initiatives are being implemented to improve work place efficiencies, especially with regard to minimizing current reliance on hard (paper) copy for generating and distributing project information. Initiatives leading towards implementation of the "paperless office" concept are as follows:

Electronic distribution of information: A growing number of documents are made available to project staff through an electronic network that employees can access utilizing a popular Internet "browser" program. Through this system, project participants can electronically access procedures, periodic reports, documents, photographs, schedules, and other reference information. Making information accessible electronically is both faster and less expensive than distribution of hard copy documents to project participants.

Consolidated document control database: All of the document control registers have been consolidated into one database, which shows the status of documents (including correspondence) that have been issued through Document Control. Besides offering an enhanced retrieval tool, this database can be summarized in a printout form, which then is sent to customers who use the

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printout to select those documents where a hard copy is needed. This eliminates a past practice of automatically sending hard copy documents to customers.

Electronic Document Management System (EDMS): In FY96 the Richland ER Project will implement an EDMS that is connected to the Document Control database. The EDMS will enable document scanning, electronic document generation, electronic reviews and revisions, and read/write/print access to project documents. Based on a work flow procedures, the EDMS will facilitate the electronic generation, review, approval, distribution, and storage (for records purposes) of project documents, and will significantly reduce costs in all these areas.

7.2.17 Technology Development and Innovative Technologies

As noted in Section 3.4, RL has incorporated technology development into the Richland ER Project work scope, through establishment of a Technology Application Function. The Technology Application Function supports the Richland ER Project in identification, screening, and evaluation of innovative technologies. This effort is driven by the technological challenges inherent in a cleanup project of this magnitude, and through a combination of escalating costs and limited budgets.

The success of this effort can be seen in the following technology application accomplishments over the last year:

- Field demonstrations of six innovative technologies were conducted.
- Over fifteen innovative technologies were identified and evaluated.
- Hanford Site ER problems/needs were defined and communicated to Richland ER Project management.
- Challenge groups were formed to evaluate Richland ER Project activities.

In addition, there are several significant technology development application activities currently in the process of implementation. These activities include the following:

- Identification and evaluation of new and innovative solutions to Hanford Site ER Project problems/needs that improve on the baseline.
- Definition and communication of Hanford Site ER Project problems/needs that reflect current priorities identified by the projects.

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- Communication of technology activities across the Richland ER Project, including RL, and communities outside the Hanford Site.
- Evaluation of ER trends, looking beyond the Hanford Site, to other DOE sites and private industry to forecast ER influences on the Hanford Site.
- Support for the inclusion of technologies to meet forecasted ER needs at the Hanford Site.

7.2.18 Information Management

The Richland ER Project recognizes the crucial roles played by information management toward successful mission achievement. DOE must establish and maintain sanctioned information sources under the proper controls to guarantee all participants commonly share a complete and accurate data pool. After site remediation is complete, this information base will represent the historical record of the Hanford Site remediation process.

The Richland ER Project is custodian for three primary Hanford environmental information systems:

- The Hanford Environmental Information System (HEIS)
- The Waste Information Data System (WIDS)
- The Hanford Geographic Information System (HGIS).

The systems are operated and maintained by the ERC under the direction of RL. Together they represent the definitive Hanford Site environmental knowledge basis. RL, Hanford Site contractors, and regulators all share on-line access to these systems, yielding an accurate and consistent common data pool to guide remediation planning and efforts.

The HEIS is an Oracle-based relational database and is the primary Hanford Site repository for characterization (i.e., sampling and analysis) data. HEIS subject areas include groundwater, vadose zone soil, atmospheric information, and bioata. Analysis parameters include organics, inorganics, physical, meals, and radionuclides.

The WIDS is a PC network-based database which provides a traceable source of information about Hanford waste sites. WIDS provides a tracking system to support suspect waste site investigation/classification, remediation, and closure action activities under the *Tri-Party Agreement*. Data include the following:

- Descriptive data about waste site names and locations
- Bibliographic reference information
- Regulatory permit data for many sites

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- Summary descriptions for waste and events that occurred at each site
- Estimates of site dimensions.

All coverage complies with the Federal Geographic Data committee standards/guidelines for spatial data and metadata. Coverages include locations of key facilities, underground services, waste sites, wells, contaminant plumes, animal and vegetation populations, (etc.). These data sets are projected onto the Hanford Site digital models that are produced by the Orthophotography and Mapping Project (see below), yielding highly accurate maps or derived map products supporting remediation design, analyses, reports, presentation (etc.).

7.2.19 Hanford Site Orthophotography and Mapping Project

Historically, most Hanford Site survey and mapping activities were conducted on a very localized basis. Coordinate grids for the mappings were related only to local reference monuments. These coordinate systems did not share a direct linear relationship to the accepted geographic standard, which is the Washington State Plane Southern Section projection using the North American Datum of 1983 (WCS83S).

Recognizing the importance of accurate site basemaps to support its remediation efforts, the Richland ER Project initiated the Hanford Site Orthophotography and Mapping Project in 1993. The project consists of multiple phases of Hanford Site aerial photographic coverage. The resulting data is then utilized to produce highly accurate maps and digital models that serve as foundation for the Hanford Geographic Information System. Since the Orthophotography and Mapping Project is driven by ER remediation efforts, the specific schedule of coverages is subject to change in relation to alterations in the Richland ER Project.

7.2.20 Environmental Analytical Laboratory

The Environmental Analytical Laboratory (EAL) is a facility that is chartered to provide rapid analytical services to ERC projects at cost-competitive rates. The EAL is set up to provide capabilities to meet the specific needs of ERC projects. Analytical focus areas include metals, anions, and radionuclide screening. The facility operates under an implemented quality assurance (QA) program, and has issued procedures to support production of data deliverables that contain sample results of known quality for project use. The EAL participates in recognized Performance Evaluation (PE) programs and has received Ecology accreditation for selected methods.

APPENDIX A - ER COST BASELINE

This Appendix presents the installation cost baseline table.

Using the same relative risk categories (i.e., high, medium and low) described in Section 4.0, Table A-1 provides summary-level information in the following fields:

- Activity Number (i.e., large site cleanup project)
- Phase (i.e., assessment or remediation)
- Prior Year Costs Through FY 1994 (actual costs)
- Fiscal year costs (dollars identified individually for each fiscal year between 1995 -2002)
- Project To-Go Costs (composite values for FY 2003 - FY 2038)

Table A-1 shows that all of the Richland ER Project large site remedial action projects located in the 100 and 200 Areas represent a medium relative risk, whereas all of the decommissioning projects (along with remediation of waste sites located in 300-FF, excluding 300-FF-5 groundwater) have been identified as high relative risks. Along with the cleanup project cost information, Table A-1 also shows fiscal year costs for Program Management, Groundwater Management, and other costs.

The following are baseline costs included in the category labeled "Other":

- Prior year single-shell tank (SST) soils characterization program
- RCRA closures
- Post-closure S&M for remediated waste sites
- 1100-EM remedial actions
- Technology improvement savings.

APPENDIX A - ER COST BASELINE

Table A-1. Cost Baseline.

Activity Number	Phase	Prior Year Costs Thru FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	Project To-Go Costs
High Relative Risk											
Large Site Decommissioning	Assessment		\$29.4	\$25.0	\$9.5	\$6.6					
	Remediation		18.8	21.8	31.1	29.8					
Large Site Remedial Actions	Assessment		1.6	0.4	0.2	0.0					
	Remediation		0.2	3.4	6.1	10.7					
High Relative Risk Subtotal	Assessment		31.0	25.4	9.7	6.6	\$6.6	\$6.6	\$6.6	\$6.6	\$556.0
	Remediation		19.0	25.2	37.1	40.5	34.5	34.5	37.5	37.5	2,941.2
Medium Relative Risk											
Large Site Remedial Actions	Assessment		31.9	12.6	3.8	1.9					
	Remediation		32.3	56.5	50.4	52.6					
Medium Relative Risk Subtotal	Assessment		31.9	12.6	3.8	1.9	1.9	1.9	1.9	1.9	407.9
	Remediation		32.3	56.5	50.4	52.6	58.6	58.6	55.6	55.6	6,581.7
Low Relative Risk											
Large Site Remedial Actions	Assessment		0.3	0.1	0.0	0.0					
	Remediation		0.0	0.0	0.0	0.0					
Low Relative Risk Subtotal	Assessment		0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Remediation		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Program Management			53.4	33.8	29.5	29.1	29.1	29.1	29.1	29.1	2,902.3
Groundwater Management			0.0	0.0	0.0	14.0	14.0	14.0	14.0	14.0	1,235.2
Other			7.1	1.6	0.2	0.2	0.2	0.2	0.2	0.2	(44.1)
Total		\$788.8	\$175.1	\$155.1	\$130.8	\$145.0	\$145.0	\$145.0	\$145.0	\$145.0	\$14,580.2

All costs are in millions of dollars.

Funding for FY 1998 through FY 2002 and To-Go Costs include contingency and escalation.

Performance Fee has been integrated with project costs through FY 2038.

Other includes Technology Improvement Savings of (\$384.1) for FY 2003 through FY 2038.

APPENDIX B MAJOR INSTALLATION ENVIRONMENTAL RESTORATION DOCUMENTS

This Appendix summarizes major Richland ER Project documents.

Title	Date	Phase	Applicable Activities	Point of Contact*
Deliverables from 1989-Present				
United States DOE Richland Operations Office Environmental Protection Implementation Plan	11/9/94	Rev. 0	All Subprojects	DIS*
RCRA Facility Investigation/Corrective Measures Study Work Plan 100-DR-1	9/30/92	Rev. 0	100 Area TSDs	DIS
N Springs Expedited Response Action Project Plan	10/02/92	Final	N Reactor	DIS
Environmental Restoration Program Technical Baseline Plan	10/26/92	Final	All	DIS
Riverland Expedited Response Action Project Plan	10/27/92	Final	NA	DIS
Hanford Site Baseline Risk Assessment Methodology	05/24/93	Final	All Subprojects	DIS
Site Characterization Report: Results of Detailed Evaluation of the Suitability of the Site Proposed for Disposal of 200 Areas Treated Effluent	10/28/93	NA	NA	DIS
Non-radioactive Dangerous Waste Landfill Soil-Gas Survey: Final Data Report	12/13/93	Rev. 0	NA	DIS
Result of the Groundwater Quality Assessment Program at Low-Level Waste Management Area 1 of the Low-Level Burial Grounds	12/22/93	NA	NA	DIS
Result of the Groundwater Quality Assessment Program at Low-Level Waste Management Area 3 of the Low-Level Burial Grounds	01/07/94	Final	NA	DIS
N Reactor Shutdown Program Plan	01/10/94	NA	N Reactor	DIS
Columbia River Impact Evaluation Plan	03/17/94	NA	NA	DIS
Site Characterization Plan for the ERDF	04/28/94	Rev. 1	ERDF	DIS

NA = Not available.

*Document and Information Services (DIS) can provide copies of these documents, upon request. DIS should not be contacted regarding technical issues associated with the documents listed in Appendix B. Contact DIS at 509-375-4686.

Richland ER Project Management Action Process Document

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APPENDIX B

MAJOR INSTALLATION ENVIRONMENTAL RESTORATION DOCUMENTS

Title	Date	Phase	Applicable Activities	Point of Contact*
Remedial Investigation and Feasibility Study Report for the ERDF	06/15/94	Rev. 1	ERDF	DIS*
NEPA Roadmap for the Environmental Restoration Disposal Facility Regulatory Package	06/15/94	Part of RI/FS	ERDF	DIS
Quality Assurance Program Plan for the Environmental Restoration Disposal Facility (ERDF) - Project W-296	06/23/94	Rev. 1	ERDF	DIS
Remedial Design/Remedial Action Strategy Report	06/24/94	NA	NA	DIS
Pre-Existing Conditions Survey of Hanford Site Facilities to be Managed by Bechtel Hanford, Inc.	09/29/94	Rev. 0	All Subprojects	DIS
Hanford ERC Environmental, Safety & Health Program	01/95	Complete	All Subprojects	DIS
ERC Quality Program	08/95	Complete	All Subprojects	DIS
Richland Environmental Restoration Project 1995 FY Work Plan - Work Breakdown Structure 2.0 - Volumes 1, 2, 3, 4	10/31/94	Rev. 0	All Subprojects	DIS
Risk Reduction at the Hanford Site Facilities	11/18/94	Rev. 0	All Subprojects	DIS
Site Specific Health & Safety Plan Environmental Restoration Groundwater Sampling	11/18/94	Rev. 0	GW	DIS
Environmental Restoration Contractor Waste Minimization and Pollution Prevention Plan	12/02/94	Rev. 0	All Subprojects	DIS
Pre-Existing Conditions Survey of Hanford Site Facilities to be managed by BHI, Phase II: Dec. 30, 1994	12/29/94	Rev. 0	All Subprojects	DIS
Environmental Restoration Contract (ERC) Resource Conservation Recovery Act (RCRA) Permit Implementation Plan	12/30/94	Rev. 0	All Subprojects	DIS

NA = Not available.

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MAJOR INSTALLATION ENVIRONMENTAL RESTORATION DOCUMENTS

Title	Date	Phase	Applicable Activities	Point of Contact*
Bechtel Hanford, Inc. Implementation Plan for 10 CFR 835, Rev. 1	03/30/95	Rev. 1	All Subprojects	DIS*
Annual Surveillance and Maintenance Report for the Retired Hanford Site Facilities Fiscal Year 1994	12/30/94	Rev. 1	All Subprojects	DIS
N Springs Groundwater Pump-and- Treat System Functional and Operational Requirements	02/17/95	Rev. 1	N Reactor	DIS
Environmental Assessment for the Deactivation of the N Reactor Facilities	05/12/95	NA	N Reactor	DIS
100-N Pilot Project Management Plan	03/15/95	Rev. 0	100 Area OU	DIS
Strategy Paper Remedial Design/Remedial Action 100 Area	04/07/95	Rev. 0	100 Area OU	DIS
Environmental Restoration Disposal Facility Waste Disposal Commercialization Plan	04/27/95	Rev. 0	ERDF	DIS
Hanford Environmental Restoration Contract - Necessary and Sufficient Closure Processes Pilot Project Reduced Facility Surveillance	05/01/95	Draft A	All Subprojects	DIS
N Reactor Deactivation Program Plan	05/02/95	Rev. 0	N Reactor	DIS
Environmental Restoration Contract Baseline Update March 1995 Management Estimate Presentations by Subprojects	05/23/95	Draft A	All Subprojects	DIS
Health and Safety Plan Environmental Restoration Disposal Facility (Project W-296)	06/05/95	Rev. 0	ERDF	DIS
Environmental Restoration Disposal Facility (ERDF) Applicable or Relevant and Appropriate Requirements Study Report	06/20/95	Rev. 0	ERDF	DIS
Project Management Plan for the Environmental Restoration Disposal Facility (Project W-296) ERDF	07/10/95	Rev. 0	ERDF	DIS

NA = Not available.

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MAJOR INSTALLATION ENVIRONMENTAL RESTORATION DOCUMENTS

Title	Date	Phase	Applicable Activities	Point of Contact*
Safety Analysis for the Environmental Restoration Facility (ERDF) Project W-296	08/11/95	Rev. 0	ERDF	DIS*
Site Health and Safety Plan 100 Area B/C ERA	08/21/95	Rev. 0	100 Area OU	DIS
General Design Criteria for Environmental Restoration	09/08/95	Decisional Draft		DIS
Richland Environmental Restoration Project Fiscal Year 1996 - 1998 Work Plan Work Breakdown Structure 1.4.10.1	09/26/95	Rev. 0	All Subprojects	DIS
Environmental Restoration Disposal Facility Waste Acceptance Criteria	10/27/95	Rev. 2	ERDF	DIS
Environmental Restoration Contract Team Quarterly Radiological Safety & Health Performance Indicator Report	11/15/95	Rev. 0	ERDF	DIS
Hanford Sitewide Ground Water Remedial Strategy	11/30/95	Rev. 0	GW OUs	DIS
Environmental Analytical Laboratory Quality Assurance Plan	12/04/95	Rev. 0	All Subprojects	DIS
Pre-Selected Subcontractor Statement of Work for Preparing and Implementing the CERCLA Process for Decommissioning	12/15/95	Rev. 0	D&D	DIS
Richland Environmental Restoration Project - Project Plan December 1995	12/21/95	Rev. 0	All Subprojects	DIS
Riverland ERA Assessment	06/15/95	Rev. 0	100 Area OU	DIS
Expected Deliverable for Execution Year				
ERDF				
ERDF Project Review and Monthly Progress Report	Monthly	Monthly	ERDF	DIS
Baseline Update	3/96	Yearly	ERDF	DIS
FY97 Fiscal Year Work Plan	9/96	Draft	ERDF	DIS
ERDF Groundwater Protection Plan	1/96	Rev. 0	ERDF	DIS
CERCLA Decision Document for use of Waste Solutions	7/96	NA	ERDF	DIS

NA = Not available.

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APPENDIX B

MAJOR INSTALLATION ENVIRONMENTAL RESTORATION DOCUMENTS

Title	Date	Phase	Applicable Activities	Point of Contact*
Program Management & Support				
Hanford Site Waste Management Units Report	1/96	Rev. 4	All Subprojects	DIS*
5 Year Plan (ADS)	3/96	Draft	All Subprojects	DIS
Project Plan	11/96	Draft	All Subprojects	DIS
Technology Trending Document	9/96	Draft	All Subprojects	DIS
Engineering Guidance Document for Project Teams	NA	NA	All Subprojects	DIS
Quality Program Manual Annual Update	7/96	NA	All Subprojects	DIS
D&D				
Annual Update to Risk Assessment Report	9/96	NA	D&D	DIS
Bi-Annual Progress Reports to RL	3/96 - 9/96	NA	D&D	DIS
Hanford Site Asbestos Abatement Plan for FY97	8/96	NA	D&D	DIS
D&D Project Plan	5/96	Draft	D&D	DIS
Safety Evaluation Report	4/96	NA	D&D	DIS
NEPA Documentation	5/96	NA	D&D	DIS
Decommissioning Project Plan	8/96	NA	D&D	DIS
Annual Update of Facility Transition Workscope (BHI-00369)	12/96	NA	D&D	DIS
N Reactor				
LFI Report for new work completed under 100-NR-1 and 100-NR-2 RFI/CMS Work Plans	7/96	NA	N Reactor	DIS
Corrective Measures Study for 100-NR-1 and 100-NR-2	11/96	NA	N Reactor	DIS
Data Validation Summary Report	Within 140 days of last sample	NA	N Reactor	DIS
Performance Evaluation Report N-Springs	2/96	Draft A	N Reactor	DIS
Remedial Actions				
BC-1, DR-1, and HR-1 Remedial Design Report	3/96	Decisional Draft	100 Area	DIS
Burial Ground Strategy	NA	Draft	100 Area	DIS

NA = Not available.

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Title	Date	Phase	Applicable Activities	Point of Contact*
100-IU-2 and IU-6 Planning Documents	12/96	Pending	100 Area	DIS
100-IU-2 & IU-6 Focused Feasibility Studies	3/96	NA	100 Area	DIS*
100-IU-2 & IU-6 Proposed Plans	9/96	NA	100 Area	DIS
Barrier Year-end Summary Report	12/96	NA	200 Area	DIS
200-UP-2 LFI Report	4/96	NA	200 Area	DIS
200-UP-2 Focused Feasibility Study	12/96	NA	200 Area	DIS
200-UP-2 Proposed Plan	12/96	NA	200 Area	DIS
300-FF-2 LFI	8/94	Rev. 0	300 Area	DIS
300-FF-2 FFS	11/94	Draft A	300 Area	DIS
100-DR-2 Focused Feasibility Study and Proposed Plan	11/96	Rev. 0	100 Area	DIS
Record of Decision	3/96	NA	100 Area	DIS
Final Remediation Documentation	5/96	NA	100 Area	DIS
100-BC Treatment Action Report	9/96	NA	100 Area	DIS
100-KR-2 IRM PP	6/96	NA	100 Area	DIS
100-KR-1 IRM PP	6/96	NA	100 Area	DIS
100-KR-1 ROD for IRM Sites	9/96	NA	100 Area	DIS
100-FR-1 FFS and IRM PP	7/96	NA	100 Area	DIS
100-FR-2 IRM PP	7/96	NA	100 Area	DIS
100-FR-2 FFS	2/96	NA	100 Area	DIS
100-HR-2 FFS	5/96	NA	100 Area	DIS
100-HR-2 PP	5/96	NA	100 Area	DIS
100-HR FFS	11/96	NA	100 Area	DIS
200-UP-2 FFS	8/96	NA	200 Area	DIS
200-UP-2 PP	8/96	NA	200 Area	DIS
Barrier FFS	2/96	Draft B	200 Area	DIS
300-FF Remedial Design Report	5/96	NA	300 Area	DIS
300-FF Remedial Action Work Plan	5/96	NA	300 Area	DIS
300-FF-2 LFI Work Plan	5/96	NA	300 Area	DIS
Feasibility Studies (200-BP)	4/96	NA	200 Area	DIS
Characterization Studies	4/96	NA	200 Area	DIS
Data Validation Summary Reports	(within 141 days of last sample date)	NA	200 Area	DIS

NA = Not available.

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APPENDIX B MAJOR INSTALLATION ENVIRONMENTAL RESTORATION DOCUMENTS

Title	Date	Phase	Applicable Activities	Point of Contact*
100-KR-4 Conceptual Design Report	9/96	NA	100 Area	DIS
100-HR Conceptual Site Model Summary Report	2/96	NA	100 Area	DIS*
100-HR-3 Final RD/RA Document	4/96	NA	100 Area	DIS
100-HR Bench-Scale Treatability Tests Report	5/96	NA	100 Area	DIS
100-HR Test Plan	6/96	NA	100 Area	DIS
100-HR Test Report	9/96	NA	100 Area	DIS
(I-129 Study) Document to support future Feasibility Studies 200-BP- Common	4/96	NA	200 Area	DIS
200-PO Groundwater RFI	4/96	NA	200 Area	DIS
200-PO-1 Draft CMS	7/96	NA	200 Area	DIS
200-UP-1 LFI	7/96	NA	200 Area	DIS
200-UP-1 Initial Design Report	3/96	Internal Review	200 Area	DIS

NA = Not Available

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APPENDIX C - DECISION DOCUMENT/RECORD OF DECISION SUMMARIES

This Appendix presents brief summaries of key decision document and RODs.

The attached Table C-1 provides information on RODs that have been signed at the Hanford Site. In addition to Table C-1, the following paragraphs summarize progress that has been made on additional decision documents for the 300-FF-1/5 OUs, and the 200-UP-1 OU.

300-FF-1/5 Operable Units

A proposed plan is currently undergoing public review for the 300-FF-1/5 OUs. The preferred alternatives are selective excavation and disposal for the process waste sites (Alternative P-3), excavation and removal for the 618-4 Burial Ground (Alternative B-3), and institutional controls for groundwater (Alternative GW-2).

200-UP-1 Operable Unit

The proposed plan for the 200-UP-1 OU has completed its initial public review, and comments from the public have been incorporated. The 200-UP-1 OU is targeted for interim remedial action to address certain groundwater contaminants in southern portions of the 200 West Area. The objectives of the interim remedial action are to contain elevated concentrations of uranium and technetium-99 in the groundwater, and collect data on aquifer and contaminant response to remediation measures.

The preferred alternative thus far has been pump-and-treat. The pump and treat system would extract groundwater from the most concentrated area of the plume; treat the groundwater through various filters to remove uranium, technetium-99, and carbon tetrachloride concentrations; and then return the treated water to the aquifer through injection wells. Treated groundwater would be returned through wells that are situated to help control migration of contaminants from the high-concentration areas of the plume. However, significant public comments were raised regarding the utilization of the Effluent Treatment Facility for treatment of the effluent received from the extraction wells. Based upon disposition of these comments, a revised engineering evaluation/conceptual plan (EE/CP) and a focus sheet will be prepared for public comment. The EE/CP will be a supporting document to the proposed plan.

APPENDIX C - DECISION DOCUMENT/RECORD OF DECISION SUMMARIES

Table C-1. ROD Summaries. (page 1 of 4)

UNIT AFFECTED	DESCRIPTION OF SITE	DESCRIPTION OF SELECTED REMEDY	STATUTORY DETERMINATION
100-BC-1, 100-DR-1 and 100-HR-1 ROD	The 100-BC-1 OU is a source unit and encompasses approx. .07 sq. mi. The 100-DR-1 is a source unit and encompasses approx. .59 sq. mi. The 100-HR-1 OU is a source unit and encompasses .16 sq. mi. All three OUs are located immediately adjacent to the Columbia River.	<p>The selected remedy for the 100 Area NPL site addresses actual or threatened releases at high priority liquid radioactive effluent disposal sites at the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units. The major components of the selected remedy include:</p> <ul style="list-style-type: none"> Removal of contaminated soil, structures and debris using the observational approach. Treatment, by thermal desorption, to remove organics and/or soil washing for volume reduction, or as needed to meet waste disposal criteria. Disposal of contaminated materials at ERDF. Backfill of excavated areas followed by revegetation. <p>Sites were designated as "high priority" due to potential risks to human health and the environment. Sites classified as high-priority pose risks through one or more pathways sufficient to recommend a streamlined action via an interim remedial measure (IRM). Particular emphasis was given to the waste sites addressed in this ROD due to existing or potential adverse impacts to underlying groundwater and subsequent contaminant discharges and potential adverse impacts to the Columbia River. It is expected that some additional sites also will be remediated that are adjacent to and within the area required for remediation of the high priority sites addressed in this ROD. The ROD also provides a decision framework to evaluate leaving some contamination in place at a limited number of sites, specifically where contamination begins at depths below 15 feet. The decisions to leave wastes in place at such sites will be a site-specific determination made during RD/RA activities that will balance the extent of remediation with protection of human health and the environment.</p>	<p>This interim action is protective of human health and the environment, complies with federal and state requirements that are legally applicable, or relevant and appropriate for this interim action, and is cost effective.</p> <p>Although this interim action is not intended to fully address the statutory mandate for permanence and treatment to the maximum extent practical, this interim action does utilize treatment and this supports the statutory mandate. Because this action does not constitute a final remedy for the OUs, the statutory preference for remedies that employ treatment that reduces toxicity, mobility or volume as a principal element, although partially addressed in this remedy, will be addressed further by the final response action. Subsequent actions are planned to address the threats posed by the conditions at these OUs. Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after the commencement of the remedial action. Because this is an interim action ROD, review of this site and of this remedy will be ongoing as the Tri-Parties continue to develop final remedial alternatives for the OUs and the 100 Area NPL sites.</p>
200-ZP-1 ROD	The 200-ZP-1 is a groundwater operable unit located in the 200 West Area of the 200 Area NPL site. Contamination resulted from historic discharges to three primary liquid waste disposal sites. Predominant contaminants of concern are carbon tetrachloride and plutonium.	<p>The selected remedy uses pump and treat and is intended to minimize further migration of carbon tetrachloride, chloroform, and trichloroethylene (TCE). The IRM is designed to stabilize and reduce contaminant mass in the highly concentrated portion of the plume (2000-3000 ppb CCl₄). This is a three-phase action. Pilot scale operations are underway to determine the effectiveness of the systems. Initial results indicated that expansion of the system is warranted. The degree of expansion will be based on the amount of groundwater extraction and treated water reinjection that is deemed feasible and necessary to contain the high concentration area. Phase II will upgrade the total pump and that capacity to approx. 150 gpm. Phase III will be initiated during FY 1998 and will result in a pump rate of 150-500gpm. Pump and treat will continue until selection of a final remedy, or until such time that no further interim pump and treat operations would be required to protect human health and the environment. It is anticipated that this action would continue until at least the year 2000.</p>	<p>This interim action is protective of human health and the environment in the short-term and is intended to provide adequate protection until a final ROD is signed, complied with federal and state ARARs for the primary contaminants identified, and is cost effective. Although this interim action is not intended to address fully the statutory mandate for permanence and treatment to the maximum extent practical, this interim action does utilize treatment and supports the date. This action does not constitute the final remedy for the 200-ZP-1 OU. However, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element is addressed in this remedy. Subsequent actions are planned to address fully the threats posed by this operable unit. Because this is an interim action ROD, review of this operable unit and of this remedy will be ongoing as the three parties continue to develop and evaluate final remedial alternatives for the 200-ZP-1 OU.</p>

APPENDIX C - DECISION DOCUMENT/RECORD OF DECISION SUMMARIES

Table C-1. ROD Summaries. (page 2 of 4)

UNIT AFFECTED	DESCRIPTION OF SITE	DESCRIPTION OF SELECTED REMEDY	STATUTORY DETERMINATION
1100 Area ROD	The 1100 Area NPL Site is located in the southern portion of the Hanford Site and covers less than 5 square miles. Operable Units 1100-EM-2, 1100-EM-2 and 100-EM-3 are located in the southernmost portion of the Hanford Site and contain the central warehousing, vehicle maintenance, and transportation distribution center for the entire Hanford Site. 1100-OU-1 is located on the northeastern slope of the Rattlesnake Hills, approximately 15 miles from the 1100 Area. The site is a former NIKE missile base and control center, and is now used for the Arid Lands Ecology Reserve Headquarters. Several of the constituents of concern include trichlorethylene, nitrates, technetium-99, carbon tetrachloride, toluene, and PCBs. The individual operable units include a variety of waste sites, such as a battery acid pit, a paint and solvent pit, and antifreeze and degreaser pit, discolored soil sites, and the Horn Rapids Landfill.	The selected remedy addresses actual or threatened releases at the four 1100 Area Operable Units. At the 1100-EM-1 OU, the remedy consists of capping the Horn Rapids Landfill, offsite disposal of PCB contaminated soils, offsite incineration of soils contaminated with bis (2-ethylhexyl)phthalate, natural attenuation of groundwater that currently excess MDLs and monitoring for compliance, and continuation of institutional controls for groundwater and land use at the Horn Rapids Landfill. At the 1100-EM-2, EM-3, and OU-1 OUs, the remedy consists of offsite disposal of soils, debris and structures contaminated with solvents, PCBs, and other hazardous substances, and continuation and expansion of groundwater monitoring.	The selected remedy is protective of human health and the environment, will comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This remedy utilizes permanent solutions to the maximum extent practicable for this site, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Alternative treatment technologies were evaluated for this site, but are not included in the selected remedy. Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within 5 years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.
ERDF ROD	The ERDF is a disposal facility designed to handle wastes generated from response actions where disposal on the Central Plateau is the selected remedy for Hanford Site operable units. The selected ERDF site covers 1.6 square miles on the Central Plateau, at an elevation of 640 - 740 feet above sea level. At the nearest point, the Columbia River is located approximately 7.1 miles from the ERDF locations. Groundwater travel times from this area to the Columbia River are greater than 90 years.	This ROD addresses the disposal of radioactive, hazardous/dangerous, asbestos, PCB, and mixed wastes resulting from the remediation of operable units on the NPL at the Hanford Site. The major components of the selected remedy include the following: (1) Initial construction and operation of two disposal cells that are expected to provide an approx. waste disposal capacity of 1.2 million cubic yards. The facilities will meet MTRs and provide sufficient leachate storage capacity to ensure uninterrupted operations. Surface water runoff will be controlled. During excavation, suitable soils will be stockpiled at the ERDF site to provide materials for liner systems and for daily interim and closure covers for the landfill. Air monitoring will be accomplished by placement at ERDF of real-time air monitors for radioactive contaminants and air samples for hazardous and radioactive constituents to detect any offsite migration of contaminants. Groundwater monitoring will be performed. Appropriate measures to protect facility workers and the public will be employed during ERDF operations including contamination control and dust mitigation, and protection of personnel from industrial hazardous presented by ERDF operations. The ERDF facility will use existing or planned site transport systems for waste transport. Waste acceptance criteria shall be developed by DOE, IAW ARARs, risk/performance assessments, ERDF-specific safety documentation, and worker protection requirements. The ERDF landfill will be closed by placing a modified RCRA-compliant closure cover over the waste. Institutional controls shall be imposed to restrict public access to the landfill. Equipment will be available to transport wastes and operate the ERDF safely. Hanford Site infrastructure will be expanded as necessary to support the ERDF. A decontamination facility will be constructed consisting of, at a minimum, and impervious pad with sump, waste water storage, and secondary containment. The detailed design will be submitted to EPA for approval secondary containment.	The selected remedy is protective of human health and the environment, will comply with Federal and state requirements that are legally ARARs to the remedial action, and is cost effective. This remedy utilizes permanent solutions to the maximum extent practicable for this site. Treatment of wastes will be addressed in the OU's decision documents. As a consequence, the statutory preference for treatment as a principal element will be addressed in these future documents rather than in this ROD. This remedy will result in hazardous substances remaining onsite above the health-based levels; therefore, a review will be conducted within 5 years after commencement of this action to ensure that the remedy continues to provide adequate protection of human health and the environment. The NCP clarifies that the stated EPA's interpretation that when noncontiguous facilities are reasonably close to one another and wastes at these sites are compatible for a selected treatment or disposal approach, CERCLA allows the lead agency to treat these related facilities as one site for response purposes, and therefore, allows the lead agency to manage waste transferred between such noncontiguous facilities without having to obtain a permit. Therefore, the ERDF and the 100, 200, and 300 Area NPL sites are considered to be a single site for response purposes.

APPENDIX C - DECISION DOCUMENT/RECORD OF DECISION SUMMARIES

Table C-1. ROD Summaries. (page 3 of 4)

UNIT AFFECTED	DESCRIPTION OF SITE	DESCRIPTION OF SELECTED REMEDY	STATUTORY DETERMINATION
N-Springs Action Memo	N-Springs are a series of seeps along the southern bank of the Columbia, adjacent to the N-Reactor. Flow to the springs was altered by discharges to 1301N and 1325N Cribs of contaminated reactor cooling water. The 1301N crib is about 1000 feet from the river bank. The seeps are now contaminated with strontium-90 originating from discharges to the cribs.	Pump and treat with a removable vertical barrier. The pump and treat system would consist of extraction wells and an ion exchange resin bed with the treated effluent being discharged up gradient within the 100N Area.	Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action, may present an imminent and substantial endangerment to public health or welfare, and the environment. The ERA will be conducted in accordance with 40 CFR 300.415 as an interim response action which will contribute to the efficient performance of anticipated long term remedial action. The ERA will to the extent practicable, considering the exigencies of the situation attain ARARs. At a minimum, a 90 % reduction of strontium-90 will be achieved. However, the treated groundwater may still exceed applicable drinking water standards for tritium and strontium-90. Other wastes derived in implementing the ERA will be managed in compliance with substantive ARAR requirements. This decision was developed in accordance with CERCLA, as amended by SARA and the National Contingency Plan. This decision is based on the administrative record for this project and is expected to contribute to the efficient performance of anticipated long term remedial action for the site.
618-9 (October 18, Agreement in Principle and December 20, 1990 letter from EPA and Ecology to DOE-RL)	Burial ground in 600 Area used between 1950 and 1956, consisting of single trench containing approximately 100 drums containing about 5,000 gallons of uranium contaminated organic solvents (mostly hexone).	Phase I was to characterize the site. Phase II was to remove and stockpile the material awaiting Engineering Evaluation and Cost Analysis resulting in selection and implementation of proper and appropriate treatment and disposal method. Activity to be performed in cool weather.	Dated 12/20/90 Removal action considered time critical. EPA is the lead agency. "Off-site" is defined as the area where the action is taking place and those adjacent area necessary for implementing the remedy. ARARs must be identified, as removal actions must meet ARARs to extent practical.
Sodium Dichromate Action Memo	Located east of D and DR reactors and west of H Reactor. Burial site for discarded and crushed drums containing residual sodium dichromate. Site is 1,500 ft by 300 ft, and depth of burial 6.5 ft with a depth to groundwater of 29 ft. Site also contains homestead debris.	Excavation of all anomalies, placing the debris in dump trucks and disposal at central landfill. Sample discolored soil or non-drum debris. Stabilize area and revegetate after excavation.	ERA to be conducted in accordance with 40 CFR 300 Subpart E; TPA (Part 3, Article XIII, Section 38); CERCLA and MTCA (WAC 173-340) The ERA's goal is to achieve clean closure and unrestricted use of land.
Riverland Action Memo	Part of 100-OU-1, Riverland formerly contained a 13 square mile rail yard where rail cars were decontaminated and maintained. Located between the North Slope area and the Arid Lands Ecology North of Highway 24 and west of highway 240. The site was also used for military maneuvers.	Remove debris and other physical hazards (landlord cleanup) including structure foundations and petroleum hydrocarbon contaminated soil. A munitions survey by COE and removal by U. S. Army Ordnance Disposal will be performed in conjunction with cleanup. Cleanup will include pesticide can removal and offsite disposal at an approved facility.	This removal action may remove any future threats to the environment and may constitute the final action taken at the Riverland site. In which case, a ROD prepared for another OU should declare this site as clean. Cleanup to be conducted in accordance with 40 CFR 300 Subpart E; TPA (Part 3, Article XIII, Section 38); CERCLA and MTCA (WAC 173-340).

APPENDIX C - DECISION DOCUMENT/RECORD OF DECISION SUMMARIES

Table C-1. ROD Summaries. (page 4 of 4)

UNIT AFFECTED	DESCRIPTION OF SITE	DESCRIPTION OF SELECTED REMEDY	STATUTORY DETERMINATION
316-5 Process AM/ July, 1991 (300 APT ERA)	TSD near west side of 300 FF- 1 Operable Unit. Received process water and hazardous waste from 45 buildings and labs related to fuel fabrication. Stopped receiving hazardous materials in 1985.	Soil excavation and Interim stabilization. Excavation of contaminated sediment from trenches with field screening to determine extent of contamination. Cover and isolate contaminated material. Final remedial action for the spoils piles and trenches will be completed as part of the 300-FF-1 Operable Unit.	ERA to be conducted in accordance with 40 CFR 300, Subpart E, Hanford Federal Facility Agreement and consent order, CERCLA, RCRA and MTCA (WAC 173-340). ERAs conducted prior to final cleanup action for a site are not required to meet final cleanup standards. WAC 173-340 is an applicable ARAR, but attainment of the MTCA soil cleanup standards are not required for the ERA.
183-H Closure	Basins receiving waste from the 300 Area fuel fabrication facilities designated to reduce waste volume by natural evaporation.	Waste removal followed by construction of an engineered landfill cover. Area to be vegetated and maintained.	Closure plan attached to RCRA Permit Application for the Site. The Part B RCRA Permit approved the closure plan. This RCRA closure site is located within a CERCLA unit; per the Hanford Federal Facility Agreement and Consent Order, the 100 HR-1 operable unit will be remediated as a RCRA past practices unit.
CCL4 ERA	Plumes of chlorinated organics (mostly CCL4) primarily originating at 216-Z-1A, 216-Z-9 and 216-Z-18, near the center of the Hanford Site. The disposal sites contain in excess of 100 nCi/g of Transuranic radionuclides. Area in which the groundwater exceeds the MCL is about 6.8 square miles. CCL4 vapor present (in 1992) above ground level is a health hazard to workers in the area.	Vapor extraction from the vadose zone with granular activated carbon recovery and off-site regeneration . This action utilizes 3 vapor extraction systems to remove the organic vapors from the soils and exhausts the vapors through canisters of activated carbon that absorb and retain the CCL4 while the clean air is released to the atmosphere.	ERA to be conducted in accordance with 40 CFR 300, Subpart E, Hanford Federal Facility Agreement and Consent order, CERCLA, RCRA and MTCA (WAC 173-340). This ERA conducted prior to final cleanup actions for 200-ZP1 and 200-ZP-2 and therefore it is not required to meet final cleanup standards or ARARs, although the action is required to be consistent with the anticipated final remedy for the effected operable units.
BC Demonstration ERA	The 100-BC-1 Operable Unit borders the Columbia river in the northwestern portion of the Hanford Site, and contains 41 waste sites. This ERA relates to sites that received spent acid rinse water from the decontamination of reactor hardware.	The selected Remove/Store alternative would excavate the hazardous substances including radionuclides at the three waste sites and store the excavated material on-site at the 100-BC-1 OU. Treatment and disposal of this waste will be included as part of the 100-BC-1 ROD. Material subject to RCRA LDR requirements will be stored separately.	Information gained during this removal action will be used in the remedial design effort for the remainder of the 100 Area. ARARs determined to be practicable for this cleanup action are : 40 CFR 300, Subpart E, Hanford Federal Facility Agreement and Consent order, CERCLA (42 U.S.C. 9600 et seq.), RCRA and MTCA (WAC 173-340). This action will also use the draft NRC and EPA standard of 15 millirem above background for radionuclide cleanup as an action level for radionuclides.
618-11 ERA	The Burial Ground is located 7.5 miles northwest of the 300 Area, within the 300-IU-1 Operable Unit. The ERA relates to disposal that is suspected to contain high activity and TRU waste.	Incorporate into the consolidated 300 Area investigation.	Programmatic issues to be addressed in three party negotiations. The 618-11 ERA would be more appropriately implemented within the context of the consolidated 300 Area investigation.
White Bluffs Pickeling Acid Cribs ERA (Sept. 7, 1993) 100-IU-5	This facility is near the White Bluffs townsite that was used for treating of metals (especially reactor piping). Metals were treated with nitric, hydrofluoric, and hydrochloric acids. The ERA relates to used acids, heavy metal residues, and oils and solvents that were disposed to two cribs.	No further action under removal authority.	To continue with evaluation for ROD, DOE must comply with 40 CFR 430. Specifically a RI/FS report including risk assessment and proposed plan must be submitted to regulatory agencies for approval.

APPENDIX D - CONCEPTUAL MODEL DATA SUMMARIES

This Appendix presents the conceptual site model, including data-derived maps, figures, tables, and narrative.

A QRA methodology has been developed to prepare human health and ecological risk assessments that support Hanford Site decision making. The QRA is an evaluation of risk for a predefined set of human and ecological exposure scenarios. It is not intended to replace or substitute for a baseline risk assessment.

Results of the QRA are used to screen sites or zones within larger soil or groundwater units that do not present significant immediate threats or significantly greater human/ecological risks. The QRA is a streamlined process that considers two human health exposure scenarios (frequent use and occasional use), four exposure pathways (soil ingestion, fugitive dust inhalation, inhalation of volatile organic from soil, and external radiation exposure), and limited ecological evaluations. For humans, risks that might occur under frequent- and occasional-use scenarios are included to provide a range of risk estimates using reasonable maximum exposure (RME) parameters, as provided in the *Hanford Site Risk Assessment Methodology* (HSRAM).

In a QRA, ecological risk is evaluated as the potential effect on the Great Basin pocket mouse (where appropriate). However, where sufficient information is available the ecological risk to human health and the environment is evaluated for other trophic pathways and receptors, which include the following:

- An evaluation of the data sources and/process information.
- Identification of maximum constituent concentrations, where data is available.
- An analysis of potential groundwater impacts.
- Identification of key factors that contribute to uncertainty throughout the risk assessment process.

An Ecological Conceptual Exposure Model was developed and includes the above requirements. This model is currently being used.

Table D-1 provides a list of the areas in geographical units; operable units within each area; the type of unit (source or groundwater); and the status of the QRAs.

Figures D-1 and D-2 provide an illustration of the typical conceptual models of the 100-FR-1 Source Unit and the 100-HR-3 Groundwater Unit.

APPENDIX D - CONCEPTUAL MODEL DATA SUMMARIES

A QRA has been performed for 100 and 200 Area retired and surplus facilities at the Hanford Site. In 1992, the Hanford Site recognized that unacceptable risks existed in the inventory of retired and surplus facilities. A QRA procedure and risk management study was commissioned in 1993, and resulted in the identification of the unacceptable risks associated with over 100 structures at the Hanford Site. Alternatives were assessed and resulted in a five-year plan to reduce risks to acceptable levels. This QRA integrated industrial, hygiene, chemical, and radiological hazards into a comprehensive decision tool. Updates of the risk assessment are documented annually to verify the performance of the risk reduction commitments. Changes in the risk, as assessed from year to year (e.g., structural deterioration not previously observed, source migration not previously observed, changes to risk receptors due to configuration changes, etc.), provide a basis for adjusting risk reduction plans (if required).

Table D-2 provides a list of the structures that are scheduled as D&D projects through 1998, including geographic areas, and brief description of D&D actions.

APPENDIX D - CONCEPTUAL MODEL DATA SUMMARIES**Table D-1. Management Units at the Hanford Site. (Page 1 of 2)**
(Operable units that are not priorities through 1998 are not listed.)

Area Designation	Operable Units	Type of Unit	Status of QRA
100 BC	100-BC-1 100-BC-2 100-BC-5 100-IU-1	Source Source Groundwater	Completed soils and groundwater QRAs.
100 D	100-DR-1 100-DR-2	Source Source	Completed soils and groundwater QRAs.
100 H	100-HR-1 100-HR-2 100-HR-3 100-IU-2 100-IU-3 100-IU-4 100-IU-5 100-IU-6	Source Source Groundwater Source Source Source Source Source	Completed soils and groundwater QRAs.
100 F	100-FR-1 100-FR-2 100-FR-3	Source Source Groundwater	Completed soils and groundwater QRA.
100 K	100-KR-1 100-KR-2 100-KR-4	Source Source Groundwater	Completed soils and groundwater QRAs.
100 N	100-NR-1 100-NR-2 100-NR-3	Source Groundwater Source	Completed soils and groundwater QRAs. (NR-1 may be revised based on new sample data.)
U Plant	200-UP-1 200-UP-2	Source Groundwater	Soils and groundwater QRAs are complete; documentation is included in the AAMS.
Z Plant	200-ZP-1 200-ZP-2 200-ZP-3	Groundwater Source Source	Soils and groundwater QRAs are complete; documentation is included in the AAMS.
S Plant	200-RO-1 200-RO-2 200-RO-3 200-RO-4	Source Source Source Source	Soils QRA is complete; documentation is included in the AAMS.
T Plant	200-TP-1 200-TP-2 200-TP-3 200-TP-4 200-SS-2	Source Source Source Source Source	Soils QRA is complete; documentation is included in the AAMS.

APPENDIX D - CONCEPTUAL MODEL DATA SUMMARIES

Table D-1. Management Units at the Hanford Site. (Page 2 of 2)
 (Operable units that are not priorities through 1998 are not listed.)

Area Designation	Operable Units	Type of Unit	Status of QRA
PUREX	200-PO-1 200-PO-2 200-PO-4 200-PO-5 200-PO-6	Groundwater Source Source Source Source	Soils and groundwater QRAs are complete; documentation is included in the AAMS.
B Plant	200-BP-1 200-BP-2 200-BP-3 200-BP-4 200-BP-5 200-BP-6 200-BP-7 200-BP-8 200-BP-9 200-BP-10 200-BP-11 200-SS-1	Source Source Source Source Groundwater Source Source Source Source Source Source Source	Soils and groundwater QRAs are complete; documentation is included in the AAMS.
Semi-Works	200-SO-1	Source	Soils QRA is complete; documentation is included in the AAMS.
200 North	200-NO-1	Source	Soils QRA is complete; documentation is included in the AAMS.
200 IU	200-IU-1 200-IU-2 200-IU-3 200-IU-5 200-IU-6	Source Source Source Source Source	Soils QRA is complete.
300 Area	300-FF-1 300-FF-2 300-FF-5	Source Source Groundwater	Baseline risk assessment complete. QRA in progress. Baseline risk assessment complete.
1100 Area	1100-EM-1	Source	Soils QRA is complete.

APPENDIX D - CONCEPTUAL MODEL DATA SUMMARIES

Figure D-1. Hypothetical Exposure Pathway Model.

APPENDIX D - CONCEPTUAL MODEL DATA SUMMARIES

Figure D-2. Trophic Levels and Receptor Species Considered in Development of Conceptual Models.

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APPENDIX D - CONCEPTUAL MODEL DATA SUMMARIES

Table D-2. D&D Projects.

Area Designation	Unit Identification	Description
100-BC	183-C Filter Plant	Demolition
	190-C Complex	Demolition
	104-B1 Tritium Vault	Demolition
	104-B2 Tritium Vault	Demolition
	1701 BA Badge House	Demolition
	103 B Unirradiated Fuel	Demolition
	1608 B Vacuum Seal House	Demolition
	1702 C Badge House	Demolition
	105 C Water Tower	Demolition
	1714 Solvent Storage	Demolition
	116 B Rx Stack	Demolition
	105 C High Tanks	Demolition
	105 C Rx Safe Store	Barrier Installation
200-West	233-S PU Concentration Facility	Inventory Reduction/Stabilization (IRM)

APPENDIX E - PROJECT CONTROLS

This Appendix contains a brief description of the project controls system for the Richland ER Project.

The purpose of Appendix E is to outline the Richland ER Project's compliance with the principles set forth in *Joint Program Office Direction on Project Management* (January 1996). Appendix E briefly outlines guidance for the following activities:

- Baseline planning, development, and approval
- Project reporting and performance measurements
- Change management and control.

The Richland ER Project embraces the basic principles and good management practices established in the *Joint Program Office Direction on Project Management*. These basic principles include management planning and documentation, decision approvals, change control, and reporting requirements. The basic types of DOE projects include strategic systems, line items, operating/expense funded projects, and general plant and capital equipment projects. The Richland ER Project is defined as a single strategic system, with specific onsite activities identified as subprojects.

In addition to endorsing sound project management principles, the Richland ER Project actively pursues the following objectives:

- To ensure that all projects clearly support program missions and do not commit resources before projects are adequately defined.
- To delegate decision authority to the lowest level practical, so as to complete cleanup projects on schedule.
- To establish a project baseline that defines scope, schedule, and cost requirements throughout the life of the Richland ER Project.

The Richland ER Project follows RCRA, CERCLA, and other legally binding requirements (as specified in the *Tri-Party Agreement*) as well as applicable DOE direction and management systems. Critical baseline decisions are fully integrated between DOE, EPA, and Ecology. These decisions are also reviewed by various stakeholders and trustees represented on the HAB. No critical baseline changes are addressed without first considering internal and external stakeholder values and expectations.

The Richland ER Project management control system is depicted in Figure E-1.

APPENDIX E - PROJECT CONTROLS

E.1 Baseline Planning, Development and Approval

Baseline planning includes management actions necessary to develop a technical, cost, and schedule baseline. These actions have culminated in a baseline that is documented by the *Project Baseline Summary*, the *Long Range Plan* (LRP), and the *Baseline Environmental Management Report* (BEMR).

The first baseline addressing the life of the Richland ER Project was developed by the M&O contractor in the spring of 1994. This baseline was approved for use by the Office of Environmental Restoration, Northwestern Area Programs. An extensive baseline update was performed in the fall of 1995. The Richland ER Project baseline document (August 1995) was submitted to HQ for approval in October 1995. The August 1995 baseline represented the best available information available at that time.

However, the baseline was subsequently reassessed and major changes were identified that resulted in a nine-year reduction of the baseline schedule. In January 1996, the baseline changes were documented in the *Long Range Plan* (LRP) *Interim Study* and, in February 1996, EPA and Ecology reviewed the changes. The Richland ER Project baseline will continue to be revised and updated as new information becomes available from field characterization and remedial action efforts.

Using a graded approach, the Richland ER Project baseline incorporates very detailed cost estimates for each workscope activity planned in the current fiscal year (FY), as well as FY+1 and FY+2, using parametric cost models (MCACES) for estimating the costs for out-year activities. Cost model estimates are eventually replaced with detailed cost estimates.

E.2 Project Reporting and Performance Measurements

The *LRP Interim Study* is the management tool for establishing performance measures for FY97. In support of strategic measures (e.g., high-level mission goals) developed by HQ, the Richland ER Project will prepare project-specific performance measures for FY97.

In accordance with the *Governmental Performance and Results Act* (GPRA), performance measures will be required in FY97. All government-funded programs will have to comply with this new law. The purpose of the GPRA is to provide a greater impetus for reducing government spending and, at the same time, increasing government accountability through performance measure management and reporting.

APPENDIX E - PROJECT CONTROLS

E.3 Change Management and Control

Change management includes those management actions necessary to ensure adequate control of changes to the Richland ER Project baseline. Revisions to the technical, cost, and schedule baseline are managed in a controlled and disciplined manner, in accordance with HQ and RL orders and directives. Management of project baselines and contingencies are controlled within established threshold levels and approval requirements.

The change control process requires identification of a baseline change proposal, which is documented, reviewed, approved, and traceable to applicable baseline documentation. Primary Richland ER Project objectives are as follows:

- Maintain accurate baseline data and supporting descriptions.
- Incorporate baseline changes and maintain clear traceability.
- Commit resources and perform work that has been properly planned and authorized.

APPENDIX E - PROJECT CONTROLS

Figure E-1. Management Control System.

APPENDIX F - SOURCES CITED IN THE MAP DOCUMENT

This Appendix identifies the references used in preparation of the MAP document. The references are organized in terms of the specific sections of the MAP document where each reference is cited.

NOTE: For more specific information regarding these references, contact Publication and Graphic Services at 509-372-9007.

Section 1.0

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)

Management Action Process Workshop Notebook, DOE ER Program, 1995

Final Management Action Process (MAP) Resource Guide, Office of Environmental Restoration, EM-40, January 29, 1996

Section 2.0

Draft Hanford Remedial Action Environmental Impact Statement (HRA-EIS)

Comprehensive Land Use Plan (CLUP)

The Future for Hanford: Uses and Cleanup, A Final Report of the Hanford Site Uses Working Group (FSUWG Report)

Hanford Site Risk Assessment Methodology (HSRAM)

Section 3.0

Hanford Past Practice Strategy (HPPS)

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)

Section 4.0

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)

APPENDIX F - SOURCES CITED IN THE MAP DOCUMENT

Section 5.0

Hanford Environmental Restoration Strategy

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)

The Future for Hanford: Uses and Cleanup, A Final Report of the Hanford Site Uses Working Group (FSUWG Report)

Hanford Past-Practice Strategy (HPPS)

Aggregate Area Management Study (AMS)

Environmental Restoration Strategic Plan, EM-40, August 1995

Section 6.0

Long Range Plan (LRP) Interim Study

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)

Section 7.0

Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)

Appendix D

Hanford Site Baseline Risk Assessment Methodology (HSBRAM)

Appendix E

Joint Program Office Direction on Project Management

Hanford Federal Facility Agreement and Consent Order

Long Range Plan (LRP) Interim Study

Project Baseline Summary

Baseline Environmental Management Report (BEMR)

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