EXECUTIVE SUMMARY

Revision 3 of the *324/327 Buildings Stabilization/Deactivation Project Project Management Plan* (PMP) was completed in January 2000. The following summary includes a general statement of the project scope, the approach used to upgrade the PMP, a discussion on management reserve and contingency, and the results and path forward associated with the upgraded plan.

Project Management Plan Background and Scope

The 324 and 327 Buildings Deactivation Projects are managed, within the River Corridor Project at the Hanford Site, as a single project consistent with the Project Baseline Summary TP-08 and Hanford Site work breakdown structure 1.04.10, *324/327 Buildings Stabilization/Deactivation Project*. The overall objectives of this project are to conduct activities within the 324 and 327 Buildings that will:

- Establish a passively safe and environmentally secure configuration
- Reduce the nuclear categorization of the facilities to "radiological"
- Establish a configuration that will require minimal surveillance and maintenance pending final disposition of the buildings.

The 324 and 327 Buildings Deactivation Projects scopes include curtailment of the operating missions for these facilities; stabilization of facility systems, equipment, and residual contamination; removal of highly contaminated equipment; and containerization and removal of the 324/327 Buildings "Special-Case Waste" (as defined by *Hanford Federal Facility Agreement and Consent Order* [Tri-Party Agreement] Milestone M-92) and other wastes managed under Tri-Party Agreement Milestone M-89. The scope also includes the closure of various areas within the 324 Building to meet requirements established in the *324 Building Radiochemical Engineering Cells, High-Level Vault, Low-Level Vault, and Associated Areas Closure Plan*, DOE/RL-96-73 (the closure plan). In addition, transition activities are required to meet deactivation endpoints that were established to accomplish the overall objectives listed above and strategies described in Chapter 2.0 of this PMP.

The initial version of the PMP, including the original project cost and schedule baseline, was submitted as a draft to the U.S. Department of Energy (DOE) in July 1997 (Draft A). Subsequently, the PMP was completed and issued in March 1998 (Revision 1). The following guiding principles were used in the development of the PMP.

- The Plutonium-Uranium Extraction Plant/B Plant transition model was used for development of deactivation endpoints and gradual reduction of minimum safe resources over the lifecycle of the project.

- The project baseline (cost and schedule) was to be developed to obtain a high degree of probability for overall completion within the life-cycle budget/schedule.

An administrative change was made in December 1998 (Revision 2) to align the PMP with the current Hanford Site Financial System and to incorporate budget targets in the Fiscal Year (FY) 1999 Multi-Year Work Plan (MYWP). The budget targets included provision of funding to meet the closure plan commitments.

Technical Upgrade Approach

In October 1999, a team was established to evaluate the PMP and incorporate the results of various technical studies, decisions, lessons learned from actual completion of PMP-managed scope, and performance on budget targets established to support the FY 2000 MYWP. In addition, this team was chartered with upgrading the integration approach and planning detail to be used to establish the revised PMP. Key activities undertaken to upgrade the integration approach included:

- **Location Assessment** -- including physical walk down (where required) and descriptions of over 600 individual locations within the buildings and associated structures. Descriptions include the as-is condition, radiological hazards, chemical hazards, and industrial hazards. Greater detail has been provided for areas that present the most complex stabilization/deactivation activities. During the addition of more details to the planning, assessments were reviewed to ensure the entire scope met the project endpoints as described and estimated.

- **Requirements Analysis** -- including review of the facility endpoint documents, Tri-Party Agreement, closure plan, safety bases, Standards/Requirements Identification Documents, and other mission driving requirements. Each requirement was reviewed against the overall work breakdown structure (WBS) and tied to the element(s) it drove, impacted, or was closed by.

- **Technical Issues Management List** -- including development of issues and enabling assumptions for areas of lower certainty, and potential areas for efficiencies and accelerations in the event new technologies and/or waivers from current requirements are obtained.

- **Technical Baseline Management System** -- The system is built around the project's functional analysis as defined by the WBS. The WBS is mapped to all baseline elements (technical scope descriptions, requirements, work location descriptions, hazards identification, risks, interfaces, technical scope, issues/assumptions, input/output quantities, project resource estimates and duration, etc.). The Technical Baseline Management System provides project managers with the ability to quickly identify and assess impacts of changes resulting from any change in a project technical element. The system also provides the project manager with tracking capabilities for technical issues, enabling assumptions, alternatives analyses, decision points, waste forecasts, and interface control documentation.

As had been conducted for the draft and final version of the original PMP (through Revision 1), the team hosted over 30 workshops on individual project baseline elements to review and upgrade the baseline description, resources, duration, and uncertainties associated with the elements.

Management Reserve/Contingency

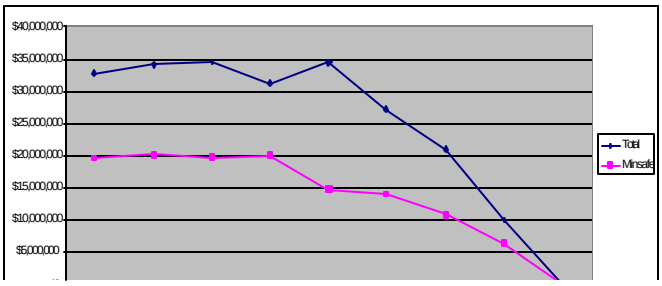
Decision points, technical insertion points, and enabling assumptions have been documented throughout the revised technical baseline and estimate. A project risk analysis, activity duration uncertainty analysis, cost uncertainty analysis, and interface uncertainty analysis will not be completed for this project. In lieu of providing for such analyses in the baseline, decision points have been identified, and performance of alternatives analyses/assessments have been scheduled for activities associated with technical, cost, and/or schedule baseline issues.

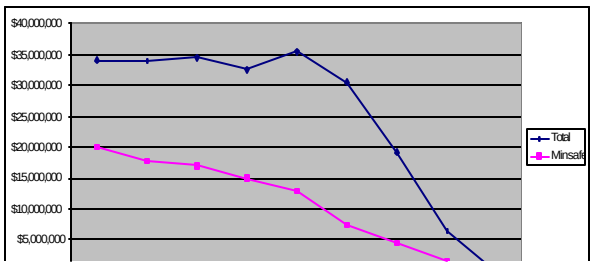
Historically, cost and schedule contingency has not been formally applied to expense-funded activities at the Hanford Site. Recently, DOE has published guidance for the development of contingency analysis and application of budget and schedule contingency for expense-funded projects. However, in this revision of the project baseline, addition of either appropriate budget or schedule contingency in accordance with the DOE guidance would not support milestones currently in existence between DOE and the regulators (Tri-Party Agreement milestones M-89 and M-92), due to the limited funding available at the Hanford Site. To accommodate the need for contingency planning, this revision of the baseline instead provides for multiple engineering analyses and decision points, and is based on highly detailed planning of activities. Inclusion of these accomodations provides for a level of planning that ensures a high-confidence schedule for activities that, in many cases, are first of a kind, and accounts for the use of systems and/or equipment that are over 30 years old.

The project managers will aggressively pursue continued planning detail upgrades, effective decision-making, and progressive engineering alternatives analyses. It is anticipated that future decisions and alternative analyses will in most cases result in more efficient planning and/or break-through processes. The expected result is that there will be a steady accumulation of project contingency in the form of increasing project total float. In addition, the project is aggressively pursuing further reductions in minimum safe functions to improve resource availability for acceleration of the upgraded baseline.

Results and Path Forward

The reviews and upgrades of the baseline planning generated a new budget and schedule profile that, in total, will result in project completion within the original schedule constraint and within 1/2% of the originally forecasted estimate-to-completion (FY 2000 MYWP based on March 1998 detailed planning effort). Significant detail was added to the scope descriptions, and resources were revised to reflect actual results from prior years of experience. In some cases, new work scope was added to the baseline; however, the conservatism built into the previous baseline (March 1998) allowed for the additional work scope to be performed for a minimal budget increase and no revision to the final completion date.



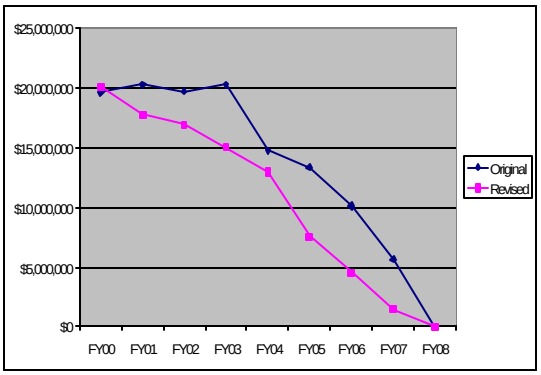


In addition, the results of the upgraded approach and planning provide the project with a highly detailed plan and strategy for project completion. The PMP includes:

- Over 6,000 activities (compared to 4,000 in Revision 2)
- Approximately 19,000 resource allocations
- 2,550 mapped requirements
- Approximately 600 standardized templates or unit cost factors.

When the original baseline is compared to the revised baseline, it is evident that a more realistic cost curve reduction for minimum safe activities is planned in the revised baseline. The revised baseline redirects the cost savings associated with minimum safe activities back into project activities. Additional reductions will, in turn, be realized through re-investment of saved funds in accelerating the deactivation of systems. The deployment of this strategy results in an accelerated completion of work scope with the minimum need for incremental funding increases.

Comparison of Minimum Safe Costs



Waste removal, closure, and transition of the 324 and 327 Buildings and associated structures are expected to cost $130 million, and will require eight years to complete. Surveillance and maintenance costs (minimum safe activities) are estimated at $20 million per year for FY 2000, and are reduced each year, as significant risk reduction activities are completed. Post-transition surveillance and maintenance will be targeted to a cost estimate of $400,000 (total for both buildings) per year.

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LIST OF TERMS

ABC	Activity Based Cost		MW	Mixed waste
ACWP	actual cost of work performed		MYWP	Multi-Year Work Plan
AEA	*Atomic Energy Act of 1954*		NEPA	*National Environmental Policy Act of 1969*
AJHA	Automated Job Hazard Analysis		OSHA	Occupational Safety and Health Agency
ALARA	as low as reasonably achievable		PHMC	Project Hanford Management Contract
BCR	Baseline Change Request		PMCS	Project Management and Control System
BCWP	budgeted cost of work performed		PMP	Project Management Plan
BCWS	budgeted cost of work scheduled		PNNL	Pacific Northwest National Laboratory
BHI	Bechtel Hanford, Inc.		PTL	Post-irradiation Testing Laboratory
BOE	Basis of Estimate		PUREX	Plutonium-Uranium Extraction Plant
CAM	Cost Account Manager		QA	Quality Assurance
CFR	Code of Federal Regulations		QAPP	Quality Assurance Program Plan
closure plan	*324 Building Radiochemical Engineering Cells, High-Level Vault, Low-Level Vault, and Associated Areas Closure Plan*		RCRA	*Resource Conservation and Recovery Act of 1976*
DOE	U.S. Department of Energy		RCT	Radiological Control Technician
DOE-HQ	U.S. Department of Energy, Headquarters		REC	Radiochemical Engineering Cells
EAC	estimate at completion		RH-TRU	remote-handled transuranic waste
Ecology	Washington State Department of Ecology		RL	U.S. Department of Energy, Richland Operations Office
EDL	Engineering Development Laboratory		RLWS	radioactive liquid waste system
EM-43	DOE-HQ Richland Office		SMF	Shielded Material Facility
EPA	U.S. Environmental Protection Agency		RPS	retention process sewer
ES&H	Environment, Safety & Health		S&M	surveillance and maintenance
ExHPIF	Expanded HPIF		S/RID	Standards/Requirements Identification Document
FH	Fluor Hanford		SCW	special-case waste
FTD	Facility Transition Division		SERF	Shielded Environmental Radiometallurgy Facility
FY	fiscal year		TBMS	Technical Baseline Management System
HANDI	Hanford Data Integration (system)		Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
HEPA	high-efficiency particulate air		TRU	transuranic
HLV	High-Level Vault		TSD	treatment, storage, and disposal
HPIF	Historic Property Inventory Form		WAC	Washington Administrative Code
HVAC	heating, ventilating, and air conditioning		WBS	work breakdown structure
IAMIT	Inter-Agency Management Integration Team		WDOH	Washington State Department of Health
ISMS	Integrated Environmental, Safety and Health Management System		WESF	Waste Encapsulation Storage Facility
LLMW	low-level mixed waste		WTEL	Waste Technology Engineering Laboratory
LLV	low-level vault		WESF	Waste Encapsulation Storage Facility
LLW	low-level waste		WTEL	Waste Technology Engineering Laboratory
LWHS	Liquid Waste Handling System			

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1.0 INTRODUCTION

This chapter provides background and overview information on this Project Management Plan for the 324 and 327 Buildings Deactivation Projects (hereafter referred to as the PMP) and on the projects themselves.

1.1 Background Information

This PMP sets forth the plans, cost and schedule baselines, organization, and control systems for managing the 324 and 327 Buildings Deactivation Projects. The projects will result in the transition of the 324 and the 327 Buildings located in the 300 Area of the Hanford Site to a safe and stable condition requiring minimal surveillance and maintenance (S&M). Figure 1-1 is a map of the Hanford Site; Figure 1-2 shows the locations of the 324 and 327 Buildings.

The 324 Building is a Hazard Category II nonreactor nuclear facility designed to be highly adaptable and able to accommodate the study of chemical processes, from laboratory to pilot scale, at varying levels of radiation, from background to megacuries. The 324 Building was also used for the examination and mechanical testing of irradiated test specimens. The 324 Building contains the laboratory, support buildings, and offices previously used to pursue technical laboratory operations.

The 327 Building is a Hazard Category II nonreactor nuclear facility, designed to provide shielded, ventilated, and specially equipped laboratories for the physical and metallurgical examination and testing of irradiated fuels, concentrated fission products, and irradiated structural materials.

The operational missions of the 324 Building and the 327 Building have been completed, leaving significant radiological contamination and industrial hazards within both buildings. The buildings have entered the decommissioning process, which is generally comprised of three distinct phases: the facility transition phase, the S&M phase, and the facility disposition phase. This PMP addresses the stabilization and deactivation actions that will be undertaken as a part of the transition phase of decommissioning the 324 and 327 Buildings.

1.2 Purpose

The purpose of the 324 and 327 Buildings Deactivation Projects is to establish a passively safe and environmentally secure configuration of the 324 and 327 Buildings at the Hanford Site and to preserve that configuration for a minimum of 10 years. The 10-year horizon will be used to predict future maintenance requirements and represents the typical time span needed to define, authorize, and initiate the follow-on facility disposition activities. In addition, the project will include the closeout of environmental permits and issues associated with these buildings. Specifically, this project will implement the closure activities and requirements of DOE/RL-96-73, *324 Building Radiochemical Engineering Cells, High-Level Vault, Low-Level Vault, and Associated Areas Closure Plan* (hereafter referred to as the closure plan).

The projects will remove, reduce, and/or stabilize the industrial, radiological, and chemical hazards within the 324 and 327 Buildings. Completing these activities reduces potential hazards to personnel, the public, and the environment, and allows for a reduced level of surveillance during the S&M phase of facility decommissioning (prior to final facility disposition). Personnel health and safety is of primary importance during transition, supporting the Hanford Site implementation of an Integrated Environmental Safety and Health Management System (ISMS). Transition actions will place the buildings in a condition that no longer requires high levels of S&M activities to maintain safe plant conditions.

When fully transitioned, the buildings will be unoccupied and locked. The buildings will contain no active systems or utilities except surveillance lighting and necessary monitoring instrumentation. Entries into the buildings for surveillance purposes will be administratively controlled.

Transition of the 324 and 327 Buildings will present challenges similar to those presented at other U.S. Department of Energy (DOE) radiologically contaminated buildings that already have been transitioned, or that will be transitioned in the future. The project is expected to continue to build on the lessons learned from previous and ongoing transition projects, and to contribute after transition is completed, to the knowledge base for future transition of other buildings.

1.3 Project Management Plan Overview

The PMP has been prepared in accordance with the guidelines provided in DOE Order 4700.1, *Project Management System* (DOE 1992); DOE/EM-0318, *Facility Deactivation Guide—Methods and Practices Handbook - Emphasizing End Points Implementation*; the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement), Sixth Amendment, Chapter 8.0, "A Facility Decommissioning Process," and lessons learned from other nuclear facility transition projects. This PMP describes how the 324 and 327 Buildings Deactivation Projects will be managed, and it communicates summary-level scope, cost, and schedule information.

The PMP for transition of the 324 and 327 Buildings consists of the following distinct, but related, parts.

- The PMP document, that provides strategies and systems for managing the projects, also includes an overview of project scopes, schedules, and costs. The PMP will be maintained current as the projects progress and as the detailed supporting documentation is developed or modified.

- Supporting appendices, that provide the detailed documentation for application and implementation of the PMP strategies, as well as the detailed schedule and cost data, will be used to provide guidance to project staff for detailed work planning and management of the projects. The appendices will be maintained and approved by the contractor, FH.

Together, the PMP document and supporting appendices form the body of knowledge for the projects, and will be a useful working tool throughout the life of the projects.

Figure 1-1. Map of the Hanford Site.

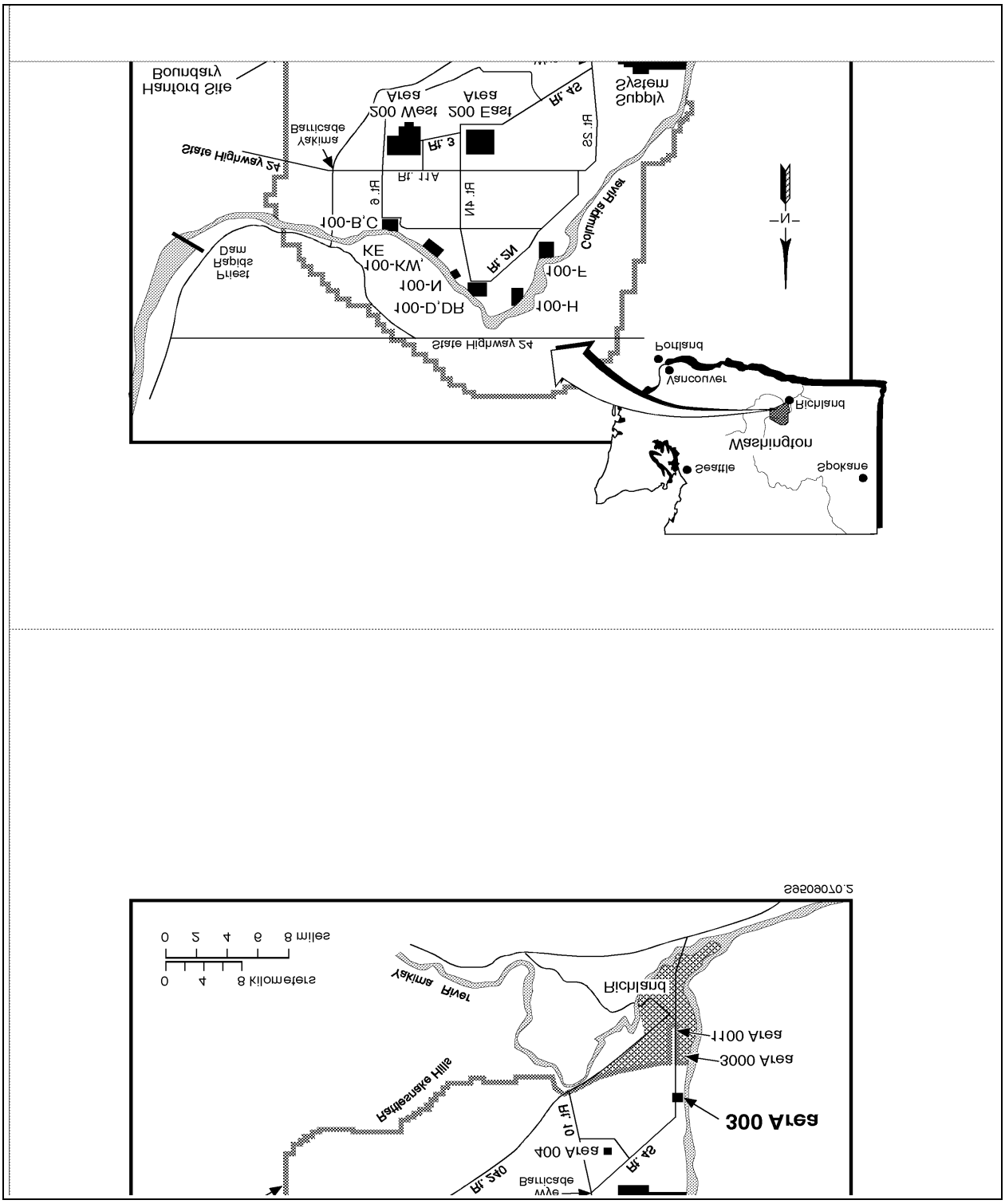
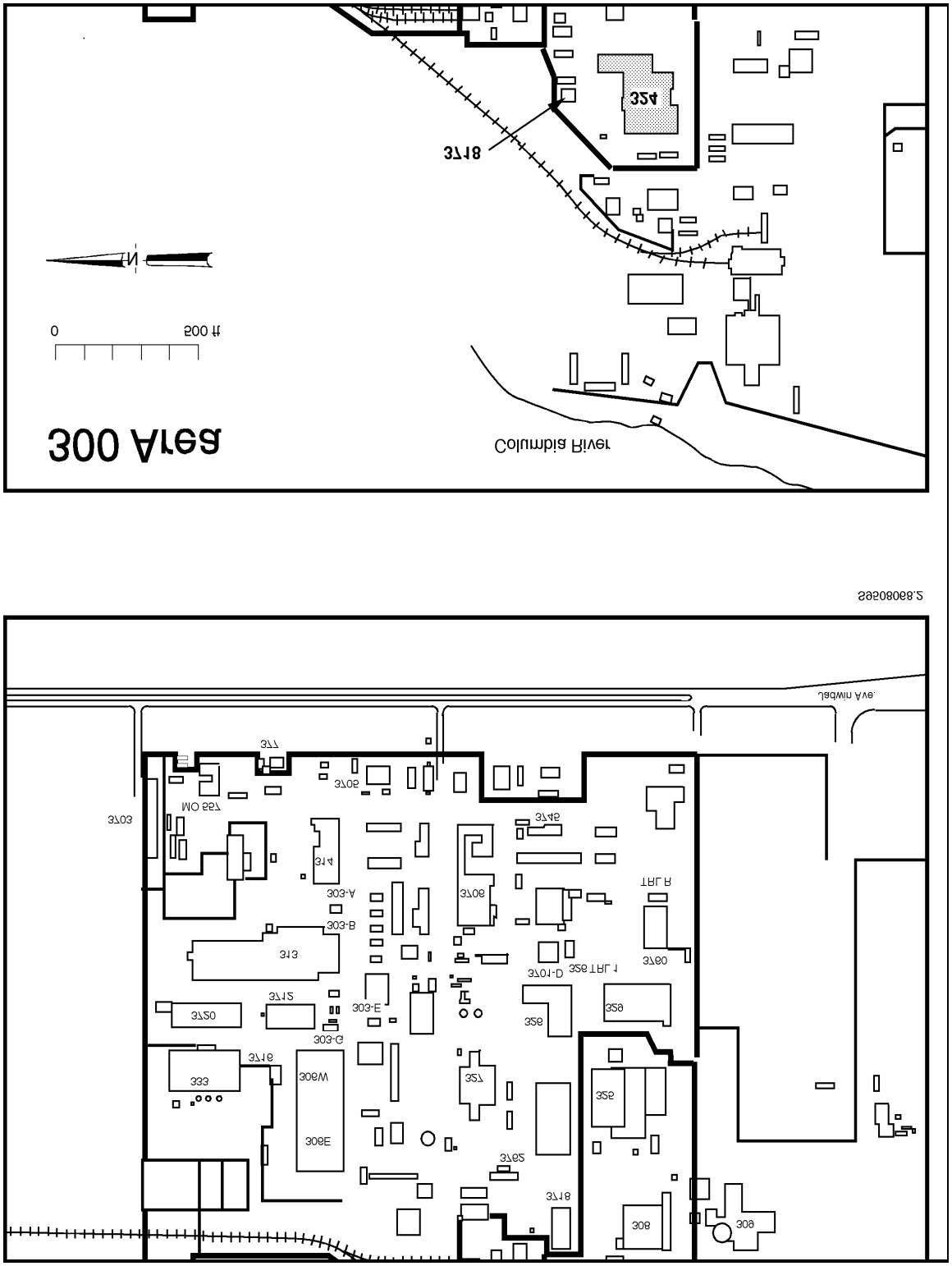


Figure 1-2. Location of 324 and 327 Buildings in the 300 Area.



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2.0 PROJECT OBJECTIVES

This chapter describes the overall 324 and 327 Buildings Deactivation Projects' mission, key objectives, and guiding principles necessary to provide a project framework and focus. The chapter also identifies the systems engineering and strategic approaches that are being taken to ensure successful completion of the projects.

2.1 Mission

The mission of the 324 and 327 Buildings Deactivation Projects is to accomplish the safe, cost-effective stabilization and deactivation (transition phase) of the buildings and associated structures, using innovative techniques that will eliminate or mitigate all building risks and result in stable conditions requiring minimal and low-cost S&M activities. When fully transitioned, the buildings will be unoccupied and locked. The buildings will contain no active systems or utilities except surveillance lighting and necessary monitoring instrumentation. Entries into the buildings for surveillance purposes will be administratively controlled.

2.2 Key Objectives

- **Cost objective:**
  - Reduce the annual S&M costs for each building; target S&M baseline is $400,000 for both buildings.

- **Schedule objective**:
  - Accomplish the deactivation and placement of the 324 and 327 Buildings into a low-cost S&M state by September 30, 2007.

- **Technical objectives:**
  - Establish building configuration such that active systems are not required for containment of stabilized radiological and industrial hazards or to ensure the safety of the public and the environment.

  - Perform deactivation in a way that results in the 324 and 327 Buildings being redesignated as “radiological” facilities, in accordance with the criteria and guidelines provided in DOE-STD-1027, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.*

  - Complete closure activities for select areas within the 324 Building Radiochemical Engineering Cells (REC), High-Level Vault (HLV), Low-Level Vault (LLV), and associated areas. Closure activities are documented in DOE/RL-96-73, the closure plan.

2.3 Guiding Principles

The following guiding principles and methods will be used to ensure that the key project objectives are met successfully.

- Improve project performance analysis, problem solving, and reporting.
- Apply lessons learned from commercial and other Hanford Site deactivation projects (i.e., Plutonium-Uranium Extraction [PUREX] and B Plant facilities) to the maximum extent possible.
- Continue to build upon the developing knowledge and experience of the 324 and 327 Buildings deactivation/stabilization personnel.
- Involve regulators and other stakeholders, as appropriate, in the development of endpoint criteria, project plans, and schedules.
- Update and modify the required building safety authorization basis envelope in real time, using the unreviewed safety question determination and other innovative, cost-effective methods to reduce S&M costs.
- Transition the workforce out of the 324 and 327 Buildings using redeployment or out-placement.
- Use a graded approach with innovative and cost-effective methods to meet environmental, safety, and health requirements and reduce transition costs.
- Develop, publish, and use project performance metrics to monitor and assess key aspects of project performance, including safety, compliance, cost, and schedule.

Transition of the 324 and 327 Buildings will greatly reduce the hazards and risks associated with these buildings. It also will greatly reduce the costs of S&M until the facility disposition phase begins. Using the lessons learned from PUREX, B Plant, and other deactivation projects, further improvement to the transition methods is anticipated.

2.4 Systems Engineering Approach

Because of the complexity of the 324 and 327 Buildings Deactivation Projects, and their dependencies and interrelationships with other projects at Hanford, a systems engineering approach is used to ensure project thoroughness. The project baseline is based on a thorough functional analysis of the project scope required to meet the mission objectives and endpoints. These functions map, in general, to the site technical baseline, the schedule baseline, the budget baseline, and the PMP.

The systems engineering approach at the 324 and 327 Buildings Deactivation Projects further defines the project in terms of the specific functions that must be performed and the requirements that

must be met throughout project conduct. These functions and requirements are translated into logic sequences that are employed and lower-tier activities that must be performed to complete the project. The activities are then resource-loaded and translated into schedule sequence, from which a detailed cost estimate is prepared.

Upon completion of these essential planning elements of the systems engineering approach, the project technical, schedule, and financial baseline is fully defined, including technical alternatives, issues, and assumptions upon which the planning is based. As they are developed, these elements of the systems engineering approach are assembled into planning and programmatic documents that fully define the project and constitute the official project baseline.

The requisite linkages among the elements, requirements, and functions are accomplished by use of the Technical Baseline Management System (TBMS) that forms the foundation for this PMP. This software is the tool by which updates and changes to the technical baseline can be maintained, and it is described further in Section 3.1.2 of this document.

2.5 Strategic Approach

Stabilizing and deactivating the 324 and 327 Buildings and their associated support structures is an important task that will result in significant mortgage reduction in the 300 Area of the Hanford Site. Project challenges and strategies for success are addressed in this chapter. In particular, these include, but are not limited to the following:

- Ensuring successful implementation of the revised programmatic baseline
- Improving operating efficiency and productivity (reaching a high level of plant and operational performance), thus avoiding interruptions and delays due to facility upsets or other similar events
- Identifying and acting on opportunities to accelerate stabilization, waste disposition, and deactivation activities
- Identifying and acting on opportunities to reduce costs associated with routine S&M activities, thereby freeing up funding for reinvestment in additional stabilization and deactivation activities.

To address each of these challenges, a strategy for success has been developed and will be implemented as discussed below.

2.5.1 Enhance Project Control and Business Management Functions

The 324 and 327 Buildings Deactivation Projects have developed a high-confidence programmatic baseline and a strengthened technical baseline for the projects. Adherence to these baselines will be ensured through projectization and the application of Project Management/Systems Engineering practices. The project will undertake the following steps to meet this challenge.

- Execute a projectized approach to management of the projects, supported by solid Systems Engineering practices.
- Use a highly qualified program management staff to focus on project scope, schedule, and cost.
- Establish and maintain solid programmatic and technical management baselines for the projects, based on the PMP, and apply rigorous management control systems for managing the impacts of changes to the baselines.
- Improve the quality of technical engineering work supporting the project.
- Provide management control systems orientation and training to functional managers and key support staff, and upgrade management accountability for project cost and schedule performance.
- Improve project performance analysis, problem solving, and reporting.

2.5.2 Upgrade Plant Productivity

The 324 and 327 Buildings Deactivation Projects are committed to improving operating efficiency and productivity, with the goal being to avoid interruptions and delays due to facility upsets or other similar events. The following steps will be taken to reach this goal:

- Judiciously expand the application of predictive maintenance and “run to failure.”
- Develop and implement redesigned, streamlined work management and procedure development processes.
- Update the existing 324/327 Buildings organization structures to provide for multi-disciplined work teams closely aligned to the various project mission requirements.
- Upgrade work planning, coordination, and scheduling within the 324 and 327 Buildings. Develop a backlog of pre-planned and approved work packages to allow a rapid transition of personnel and resources.

- Develop and maintain a performance measurement system for tracking Total Operating Efficiency parameters to allow periodic reviews for the identification of opportunities for improvements.

2.5.3 Accelerate Stabilization, Waste Packaging, and Waste Disposition

The 324 and 327 Buildings Deactivation Projects must continue working to identify, evaluate, and execute alternatives for accelerating facility stabilization and waste management activities. Accepted alternatives will be incorporated into the project baseline that reflects the accelerated path forward. The projects will also complete the necessary planning and prepare the essential processes necessary for aggressively moving forward in FY 2000 on additional stabilization and waste management activities. The projects will take the following steps.

- Issue the revised PMP to scope the currently projected life cycle of the project based on requirements; identify key issues, assumptions, alternatives and opportunities; and provide a framework for analysis of alternatives to the existing baseline.

- Using resources from throughout Hanford, commercial industry, and other DOE sites, conduct trade/engineering studies and alternatives analyses, as necessary, and resolve key issues associated with the stabilization and deactivation of the 324 and 327 Buildings.

- Resolve external issues in areas such as specifications for waste packaging, waste storage/disposal, funding uncertainties, etc.

- Define needs and make the necessary provisions for additional waste characterization.

- Perform clean out activities, maintain systems, complete system repairs (e.g., crane), and obtain/maintain regulatory permits and approvals to support accelerated transition activities.

- Apply industrial and manufacturing operating and engineering approaches to optimize the performance of individual processes.

2.5.4 Reduce S&M Costs to 'Mine Out' Stabilization and Deactivation Dollars

The annual costs of performing "minimum safe" activities consume a high percentage of available funding and constrain management's flexibility and efforts to accelerate stabilization and deactivation activities. Additionally, integration of S&M activities with project planning results in frequent diversions of resources to emergent activities, which results in delays in meeting project stabilization and deactivation goals. The 324 and 327 Buildings Deactivation Projects will take the following steps to address these challenges.

- Challenge "minimum safe" requirements to minimize the effects of this work scope on the projects' ability to accelerate and complete the stabilization and deactivation mission.

- Reinvest cost-reductions associated with reduced S&M back into the projects to support acceleration of project stabilization and deactivation goals.

- Implement the approaches described elsewhere in Section 2.4 of this PMP, which will be instrumental to successful performance of the S&M work scope. Improved project management and planning will minimize unplanned impacts of S&M activities on stabilization and deactivation goals.

2.5.5 Summary

Additional funding beyond the currently projected annual baseline will not be made available to the project. Therefore, increased efficiency combined with cost savings strategies associated with upgrading plant productivity and reducing "minimum safe" costs will need to be implemented, and savings reinvested in the project, to ensure out-year project funding needs are met.

3.0 PROJECT SCOPE

This chapter of the document provides summaries of the major elements of work required to complete the transition of the 324 and 327 Buildings.

3.1 Definition of Scope

The 324 and 327 Buildings Deactivation Projects cover the stabilization, deactivation, and minimum safe activities within the 324 and 327 Buildings. The 324 and 327 Buildings are the sites for selected stabilization activities being performed in response to Tri-Party Agreement Milestones M-89 and M-92. The activities also will eliminate security risks identified in vulnerability assessments (e.g., legacy fuel removal). The projects will remove and/or reduce human health and environmental hazards associated with the 324 and 327 Buildings. The projects will also place the buildings in the lowest radiological classification possible, resulting in minimal S&M requirements and costs, pending reuse or final disposition.

3.1.1 Background

The 324 Building, known as the Waste Technology Engineering Laboratory (WTEL), was constructed in the 1960s in the 300 Area of the Hanford Site. The building houses radiochemical and radiometallurgical hot cells and laboratories. The WTEL supported several DOE-related initiatives for high-level radioactive chemical processing and metallurgical engineering studies, as well as nonradioactive waste treatability studies. This building contains areas with significant fixed and dispersible contamination.

The 327 Building, known as the Post-irradiation Testing Laboratory (PTL), was constructed in 1953 to provide characterization and rupture analysis on irradiated fuel elements and materials for the production reactors and later DOE test reactors (e.g., Plutonium Recycling Test Reactor, SP-100, Fast Flux Test Facility, EBR-II, etc.). The 327 Building houses 11 high-density metal-shielded hot cells, two interconnected concrete, unlined, water-filled storage basins, and a dry storage cell.

3.1.2 Current Status

In November 1996, programmatic responsibility for the 324 and 327 Buildings was transferred from Pacific Northwest National Laboratory (PNNL) to the Project Hanford Management Contract (PHMC), to begin decommissioning. Preliminary endpoints were published (HNF-2119, *324 Building Endpoints*, February 1998; and HNF-2118, *327 Building Endpoints*, February 1998), to allow a technical baseline for the 324 and 327 Buildings Deactivation Projects to be formulated. In addition, the first draft of this PMP, submitted in July 1997, included draft WBS dictionaries/basis of estimate (BOE) sheets, based on the guidance developed by DOE and its contractors, published in *Project Hanford Activity Based Cost (ABC) Estimating Preparation Template* (December 21, 1995).

In October 1999, a team was established to evaluate and revise the PMP. This revision incorporates the results of various technical studies, decisions, and workshops and lessons learned from actual completion of PMP-managed scope; incorporates budget targets established to support the FY 2000 MYWP; and reflects an upgraded integration approach and increased planning detail.

To improve integration across and between the 324 and 327 Buildings Deactivation Projects, the team conducted a series of comprehensive workshops with key members of the project building staff to review the technical, cost, and schedule baselines and update them as appropriate. In addition, location assessments associated with the various areas and systems at 324 and 327 Buildings were performed, described, and documented. (Summary diagrams illustrating the results of the location assessments are provided as Figures 3-1 and 3-2.) Requirements applicable to the projects were captured and tied to implementation and/or affected work elements, technical issues and enabling assumptions were developed for tracking and closure, and life cycle waste management forecasts were developed. These assessments and other information are linked together via the TBMS, which is built around the projects' functional analysis as defined by the WBS. Thus, the WBS is mapped to all baseline elements (technical scope descriptions, requirements, work location descriptions, hazards identification, risks, interfaces, technical scope, issues/assumptions, input/output quantities, project resource estimates and duration, etc.) via the TBMS.

The PMP and BOE sheets (Appendix A) have been updated to reflect the current knowledge and work experience of the building personnel. Technical Baseline Management System reports are provided as Appendix B to this PMP. Additional resource reports and other supporting documentation are provided as Appendices C and D.

This rebaselining effort reflects the results of a number of engineering/alternative studies and analyses conducted since the last revision of the PMP, including:

- *324 Building B-Cell Characterization: Assay of Maximum Dispersible Radioactivity*, HNF-4842, Rev. 0

- *Radionuclide Inventory in Tanks 113 and 115*, prepared by Fluor Daniel Northwest, Inc., November 1998

- *B-Cell Dispersible Material Removal Engineering Trade Study*, HNF-5065, Rev. 0

- *324/327 Buildings Special-Case Waste Assessment and Disposition Alternatives Analysis*, HNF-1730, Rev. 2

- *Data Analysis and Radionuclide Scaling Factor for the B-Cell Waste Stream*, HNF-4904, Rev. 0

- *Calculation Notes for High-Level Vault Non-Destructive Assay* (in draft form)

- *324 Building Decontamination Sequencing and Details* (in draft form)

- *B-Cell Crane Long-Range Improvement Plan* (Letter, A. Clark, B&W Hanford Company, to L. J. Olguin, Fluor Daniel Hanford, Inc., BWHC-9957236, September 29, 1999)

- *B-Cell Waste Classification Sampling and Analysis Plan*, HNF-2804, Rev. 2

- *Revised Methodology for Determining Cesium-137 Content of HN-200 Grout Containers*, HNF-4799, Rev. 0

- *Revised Methodology for Estimating the Radionuclide Profile of HN-200 Grout Containers*, HNF-4905, Rev. 0

- *Radiochemical Engineering Cells Decontamination Engineering Trade Study*, HNF-5064, Rev. 0.

The workshops identified the need to perform additional engineering/alternative analysis studies. The costs and resources for completion of these studies have been loaded into the baseline schedule as a precursor to the actual work activities. The following provides a summarized listing of the number and types of engineering/alternative analysis studies that will be required to assure implementation of the rebaselined schedule:

- 327 Building spent ion exchange column separation and disposal
- Shielded Environmental Radiometallurgy Facility (SERF) Cell waste packaging and disposal alternatives
- Asbestos removal/remediation requirements during deactivation
- B-Cell liner removal technology alternatives
- Bowling ball cask deactivation alternative
- Hot cell windows deactivation and closure alternatives
- Contaminated heating, ventilation, and air conditioning (HVAC) cleanout and closure
- 327 Dry Storage Carousel residual waste removal and disposal alternatives
- Process chemicals feed tanks closure requirements
- Concrete removal/remediation requirements during deactivation
- 327 Hot Cell decontamination alternatives
- HLV/LLV tanks decontamination and removal alternatives
- SERF Cell cleanout and decontamination alternatives
- SERF Cell deactivation strategy
- 324 Building fire systems shutdown strategy
- 327 Building fire systems shutdown strategy
- 324 Building monitoring/alarms shutdown strategy
- 327 Building monitoring/alarms shutdown strategy
- Tanks and equipment size reduction alternatives
- Large, high dose waste packaging and disposal optimization
- 327 Building large, remote-handled (RH) waste items handling and disposal
- 327 Building HVAC ducting deactivation and closure alternatives

- 327 SERF cell nitrogen recirculation system ducting
- Cost/benefit analysis for large, difficult to remove, tanks and equipment deactivation alternatives
- Definition of specific facility endpoints to meet the desired "as-left" conditions consistent with requirements
- 324 Building Radioactive Liquid Waste System (RLWS) deactivation and closure alternatives.

A comprehensive listing of all the required trade/engineering/alternatives analysis studies is provided in Appendix B.3, "Issues/Enabling Assumptions," and studies are listed individually in their respective BOEs in the appropriate section of Appendix A.

3.2 324 Building Transition Subprojects

The 324 Building Transition subprojects include all the activities required to maintain the safe status of the 324 Building and associated support structures and to perform the stabilization and deactivation tasks necessary to move to a passively safe and environmentally secure configuration, to reduce the nuclear categorization of the facility to "radiological," and to establish a configuration that will require minimal S&M pending disposition of the buildings. The 324 Building Deactivation Project consists of the following major subprojects:

- 324 Building Safe and Compliant
- 324 Building Materials Removal
- 324 Building Transition.

Chapter 6.0 of this document discusses the logic used to link the subprojects and describes the critical path for the overall 324 Building Stabilization/Deactivation Project.

3.2.1 324 Building Safe and Compliant Subproject

The 324 Building Safe and Compliant subproject activities will provide the routine surveillance, operation, and maintenance required for the 324 Building's components, systems, equipment and building structures that are needed to protect the personnel, the public, and the environment from potential radioactive and industrial hazardous materials exposure that could be caused by loss of containment/control. This subproject's activities will be conducted over the life of the buildings and structures, decreasing in magnitude, scope, and costs as the hazards and risks are removed, reduced, and/or stabilized. All other subprojects that are part of the 324 Building Deactivation Project assume that the requirements associated with maintaining the building and their systems, as described and covered by this subproject, are met.

The 324 Building contains significant quantities of residual contamination, with the majority of these materials residing inside engineered containment structures. The residual contamination is primarily associated with "hot cell" activities that occurred in the past, involving experiments conducted in a controlled environment with highly radioactive materials. In some cases, the residual material is in a dispersible form and would be susceptible to release in the event of a natural disaster or major loss of building systems. Systems, equipment, and building structures are used to contain these potentially dispersible materials and to minimize their release in the event of an off-normal occurrence. These

systems, equipment, and building structures require routine surveillance and preventive measures to ensure that the safety envelope between the managed contaminants and the public, personnel, and environment, is maintained. If system or equipment failures occur, prompt and accurate responses are required. In addition, these buildings contain inventories of chemicals and dangerous waste, resulting from past operations and present building deactivation activities. The buildings contain less-than-90-day hazardous waste accumulation areas, satellite accumulation areas, chemical storage and make-up areas, and, a non-permitted treatment, storage, and disposal (TSD) unit under a closure agreement with the Washington State Department of Ecology (Ecology). Therefore, the buildings must maintain systems, equipment, and personnel to meet *Resource Conservation and Recovery Act of 1976* (RCRA) requirements for the S&M, storage, and closure of RCRA waste units. These buildings also maintain emergency preparedness and community notification capabilities.

The Safe and Compliant subproject comprises the building S&M activities required to maintain needed and necessary building systems and structures. The subproject includes required preventive maintenance and calibrations; repair of failed and malfunctioning equipment; walk down of safety systems, equipment, and building grounds (operational surveillance); routine radiological surveys, source checks, and dosimetry; building utilities and assessments; and waste management assessments. The activity also includes management and assessment activities: project direction; management and controls; and environmental, quality, and safety oversight for the minimum safe condition. (Subproject-specific oversight is included in the subproject). The activity also includes training mandated by the U.S. Occupational Safety and Health Administration (OSHA), RCRA, and DOE. Building orientation and building-specific emergency and response training are covered in this activity. The activity also provides safe, secure, and compliant storage of special nuclear materials until final disposition of the material is accomplished. In addition, the activity includes physical security, safeguards accounting and material control, record keeping, studies, evaluations, and assessments.

The Safe and Compliant subproject activities represent the potential mortgage reduction that will be recognized by implementing the waste removal, risk reduction, and deactivation subprojects. Completing waste removal, risk reduction, and deactivation activities will eliminate the drivers behind minimum safe requirements, allowing a reduction in the necessary S&M activities and thus reducing the resources required to maintain the facility.

3.2.2 324 Building Materials Removal Subproject

The following subprojects are prerequisites to building transition, and they result in significant legacy waste removal and radiological risk reduction from the 324 Building. The estimated waste volumes and types (e.g., liquid, solid, low-level waste [LLW], transuranic waste [TRU]) that will be produced during the implementation of each subproject are specified in Appendix B.2, “Waste Forecast.”

This subproject, 324 Building Materials Removal, is composed of six distinct subprojects:

- 324 Building REC Closure Project Management and Equipment Maintenance
- 324 Building REC Closure Phase I
- 324 Building REC Closure Phase II
- 324 Building REC Closure Phase III
- 324 Building REC Closure Phase IV
- 324 Building Small Projects Material Removal.

3.2.2.1 324 Building REC Closure Project Management and Equipment Maintenance Subproject

This subproject will address all the activities involved with the management and performance of the routine maintenance activities and tasks associated with the REC hot cells and gallery. Several major activities and tasks will be completed on a routine basis each fiscal year (i.e., FY 2000 – FY 2004), while others will be completed only as required to support deactivation/stabilization activities. The following is a list of activities that are included in this subproject:

- Routine Cell Maintenance
- REC Window Maintenance
- REC Gallery Maintenance
- REC Remote Viewing Maintenance
- REC Plasma Torch Maintenance
- Manipulator Changeout
- REC Grouting System Maintenance and Repairs
- REC Door Maintenance
- Procurement of 10-ton Crane upgrade spare parts
- ESP Filters Procurement and Fabrication
- HEPA Filters Procurement
- Clamshell Fabrication
- Repair of the A/D-Cell Crane
- Repair of the A-Cell Crane.

3.2.2.2 324 Building REC Closure Phase I Subproject

The 324 Building REC Closure Phase I subproject is the most significant stabilization/deactivation activity being conducted in the 324 Building. Completion of this subproject will significantly reduce actual risk to personnel and potential risk to the public and environment. The subproject is a multi-year effort, lasting through FY 2005, consisting of the following activities:

- B-Cell Rack and Equipment Removal
  - Legacy Waste Removal and Disposition
  - Rack Waste Removal and Disposition
  - Rack Preparation, Size Reduction and Packaging
  - Miscellaneous Items Removal Preparation
  - Miscellaneous Items Removal and Packaging

- B-Cell Mixed Waste Removal
  - Mixed Waste Removal Preparation
  - Mixed Waste Removal and Packaging

- B-Cell Cleaning
  - Cell Cleaning Preparation
  - Cell Cleaning
  - Cell Cleaning Robotics Support

- B-Cell Routine Waste Generation
  - Routine Cell Waste Removal

- B-Cell Closure
  - Liner Integrity Assessment
  - Debris Rule Standards
  - Closure Certification
  - Endpoint Closeout

B-Cell was designed to handle high-activity radioactive and waste materials in a research setting, with remote-handling capabilities and appropriate shielding under unique space considerations. During 25 years of research and development activities, B-Cell accumulated a significant amount of radioactive and mixed waste (MW), originally estimated to be in excess of 2.5 million curies. The work efforts that have been accomplished in B-Cell over the last two years, coupled with recently completed dose profiling studies, have reduced the holdup in B-Cell to a conservatively estimated curie inventory of less than 300,000 curies. (This estimate excludes the spent fuel assemblies.) The estimated inventory is split between contaminated waste that is currently containerized and loose materials still in the cell.

The 324 Building REC Closure Phase I subproject provides for the planning and execution of activities necessary to meet Tri-Party Agreement Milestone M-89-00, “Complete REC, HLV, LLV, and Associated Areas Closure Plan.” Actions relevant to B-Cell included under this milestone are containment and removal of all B-Cell dispersible materials, excess equipment, and debris (as defined in M-89-02, “Complete Removal of the 324 Building REC B-Cell Mixed Wastes and Equipment”) and final closure of the B-Cell. The subproject also includes maintenance of systems and radiological and operational surveillance associated with equipment and systems required to remove and handle the associated waste streams resulting from B-Cell cleanout.

3.2.2.2.1 B-Cell Spent Fuel Assemblies/Intact Rods Removal

Two significant activities are involved with the spent fuel removal from B-Cell:

- Spent Fuel Removal Preparation
- Spent Fuel Removal and Packaging.

The 324 Building B-Cell Cleanout subproject provides for the planning and execution of activities necessary to remove two fuel storage racks that currently house the light water reactor spent fuel assemblies (located within fuel assembly thimbles) and the fuel pin storage container containing 17 intact fuel pins. The fuel storage racks are temporary racks located on either side of the west window of B-Cell.

3.2.2.3 324 Building REC Closure Phase II Subproject

The 324 Building REC Closure Phase II subproject is a multi-year task. The major tasks to be accomplished by this subproject include the removal and/or stabilization of all radioactive and industrial hazards from the following areas:

- LLV
- Pipe Trench.

The LLV tanks and associated piping will be decontaminated and removed. Removal of the vault tanks is consistent with the closure plan. Major efforts will include introduction of a decontamination solution to remove residual heels, removal of piping using crimp-cutters, and removal of all accessible equipment. The liner will be decontaminated to meet clean debris rule standards, and/or the liner will be removed and concrete scabbled. Liquids generated during this deactivation process will be filtered to remove as much radiological material as possible in the C-Cell treatment skid. The captured solids will be packaged as required per the designation and shipped to an appropriate waste storage facility.

Pipe trench closure will include removing all piping using hydraulic crimp-cutters, and decontaminating the piping only as necessary to facilitate pipe removal, packaging, and disposal. The remaining trench will be decontaminated to meet clean debris rule standards, and/or the liner will be removed and concrete scabbled, and a coat of permanent fixative will be applied. The activities are consistent with the closure plan requirements.

3.2.2.4 324 Building REC Closure Phase III Subproject

The 324 Building REC Closure Phase III subproject will result in the cleanout deactivation and/or stabilization of the following locations:

- A-Cell
- C-Cell
- Airlock
- Low-Level Canyon (Room 146)
- Cask Handling/Truck Lock/Load-out Stall
- REC Operating Gallery
- Vault Sample Room 145
- 324 Support Areas
- 324 Basement.

A-Cell, C-Cell, and the airlock will require similar deactivation steps, including the following: packaging and removal of debris from the area, sealing all penetrations to prevent residual material and deactivation fluids from migrating, gross decontamination using chemical treatment (e.g., applying dry alkaline foam) or high pressure water scarification of all surfaces, and rinsing with water until the desired decontamination factor is achieved. These steps are anticipated to occur twice for each cell to achieve acceptable dose rates. When acceptable dose rates are attained, a permanent fixative coating will be applied to affix loose contamination. Additional activities include removing the remote manipulators and sealing the manipulator penetrations. In addition, the cell liners are assumed to require removal and concrete floors scarified to meet the residual contamination goals. Liners will be removed using existing cutting or developed technology, and the waste generated will be placed in appropriate containers for final disposal.

Activities planned for the low-level canyon, Room 146 (also known as the Engineering Development Laboratory [EDL]-146), include piping decontamination and removal. Room 146 pip cleanout will be performed the same as described for the piping systems from the REC Cells and the HLV and LLV.

Deactivation activities for the cask handling area (Room 137), the load-out stall, truck lock, REC Operating Gallery (Rooms 131, 244, 245, and 311), Vault Sample Room 145, B-Cell sample load out room, and other 324 Support Areas include removing loose material and contaminated equipment, as well as piping removal using hydraulic crimp-cutters, decontaminating the piping only as necessary to facilitate pipe removal, packaging, and disposal. Multiple fume hoods will be cleaned and sealed. Multiple cranes will be drained and placed in an inactive state. Floors and walls will be cleaned and sealed to allow reduction in radiological posting.

The activities for the 324 Building basement area, including Rooms 18 through 21, include removal of all combustible materials and any nuclear material from fume hoods. The lead used for shielding in the service tunnel will be removed following decontamination activities, should dose rates allow.

3.2.2.5 324 Building REC Closure Phase IV Subproject

The 324 Building REC Closure Phase IV subproject will result in the cleanout of the following locations:

- D-Cell
- HLV
- 324 Piping Closure
- B-Cell Spent Fuel Segments and Fragments Removal.

The deactivation steps required for D-Cell include: packaging and removal of debris from the cell, sealing all penetrations to prevent residual material and deactivation fluids from migrating, gross decontamination using chemical treatment (e.g., applying dry alkaline foam) or high pressure water scarification of all surfaces, and rinsing with water until the desired decontamination factor is achieved. These steps are anticipated to occur twice for the cell to achieve acceptable dose rates. When acceptable dose rates are attained, a permanent fixative coating will be applied to affix loose contamination. Additional activities include removing the remote manipulators and sealing the manipulator penetrations. In addition, the cell liner is assumed to require removal and concrete floors scarified to meet the residual contamination goals. The liner will be removed using existing cutting or developed technology, and the waste generated will be placed in appropriate containers for final disposal.

The HLV tanks and associated piping will be decontaminated and removed. Removal of the vault tanks is consistent with the closure plan. Major efforts will include introduction of a decontamination solution to remove residual heels, removal of piping using crimp-cutters, and removal of all accessible equipment. The liner will be decontaminated to meet clean debris rule standards, and/or the liner will be removed and concrete scabbled. Liquids generated during this deactivation process will be filtered to remove as much radiological material as possible in the C-Cell treatment skid. The captured solids will be packaged as required per the designation and shipped to an appropriate waste storage facility.

The 324 Building Piping Closure deactivation activities involve removing all piping using hydraulic crimp-cutters, decontaminating the piping only as necessary to facilitate pipe removal, packaging, and disposal, which is consistent with the closure plan requirements.

The 324 Building REC Closure Phase IV Subproject includes planning and execution of activities to remove, process, and repackage the irradiated fuel material segments and fragments inventory, currently located in the 324 Building. Based on a preliminary review of the available packaging and storage alternatives, including the information presented in *Assessment of Alternative Management Operations for 300 Area Light Water Reactor Spent Nuclear Fuel*, (HNF-1867, Rev. 0), the path forward that has been selected for the technical baseline is to transfer the fuel segments

and fragments in lead-lined drums to the 200 Area Central Waste Complex for interim storage as RH-TRU waste.

The selected path forward is based on the best available information. The studies to date have determined that six NAC-1 casks will be used. The segments and fragments include 16 rod-equivalent boiling water reactor and pressured water reactor fuel rod segments and 21 kg of pressured water reactor fuel fragments. All of these materials were irradiated in commercial electric power reactors and were discharged from their parent reactors as spent fuel at the end of their life cycles. After discharge, the DOE acquired the materials for the fuels examination program.

The fuel segments and fragments are currently located in D-Cell. The containers consist of a 30-gallon drum containing various small cans of unclad fuel fragments loaded into a five-gallon container; an engineered container containing consolidated spent fuel pieces; and a metal box with sections of spent fuel rods of up to one-third rod length that have been loaded into tubing capped with Swagelok fittings.

3.2.2.6 324 Building Small Projects Materials Removal Subproject

The 324 Building Small Projects Materials Removal subproject is a multi-year risk mitigation and deactivation project. The subproject includes:

- Legacy Waste Container Repackaging
- 324 SMF South Cell Restoration
- 324 Mark-42 Fines Disposition.

3.2.2.6.1 Legacy Waste Container Repackaging

The Legacy Waste Container Repackaging subproject includes the transportation, verification (examination and assay), and repackaging of the remaining waste containers inherited in the transfer of the 324 Building to the PHMC. The waste containers were designated as LLW by the waste generator. However, because of the presence of prohibited articles, these containers are required to be managed as suspect low-level MW (LLMW). At the time of building ownership transition, over 200 containers were present in various waste storage areas in the building areas. The containers require 100 percent verification (examination). A large percentage of the containers will require waste segregation and repackaging, to be conducted at the Hanford Site's T-Plant.

3.2.2.6.2 324 SMF South Cell Restoration

All equipment and debris remaining from the cesium chloride cleanout project located in SMF south cell will be packaged and removed.

3.2.2.6.3 324 Mark-42 Fines Disposition

In May 1998, DOE-RL directed FH to reassign the Mark-42 Fines Project PNNL to the 324 Building Deactivation Project for final disposition. The work scope consists of packaging 72 pipe nipples of fuel cutting fines and shipping them to Oak Ridge National Laboratory in several cask shipments. Early recommendations included the need for four round trips of the BCL-3 cask to ship all the fines. The cask will require several decontamination evolutions per shipment (before and after loading and off-loading).

3.2.3 Transition 324 Building Subproject

The major tasks to be accomplished by this subproject includes the shutdown/deactivation of all associated equipment and systems and removal and/or stabilization of all radioactive and industrial hazards from the following areas of the 324 Building and structures:

- Building Exterior and Yard
- HVAC Systems
- Laboratories and Experimental Areas
- Offices
- SMF
- Stand-alone Mothballed/Operational Equipment
- Support Areas
- Waste Streams and Utilities.

As part of the transition subprojects, a new surveillance lighting control system will be installed.

3.2.3.1 324 Building Exterior and Yard Subproject

Deactivation of the 324 Building exterior and yard includes the asphalt area, areas used for storage, areas where piping and ventilation systems penetrate exterior walls, access doors and stairs, and unloading/loading docks. The subproject also includes the 324A Building and 324D Building (exhaust stack and monitoring buildings), the 3718E Building (general storage building), and the 3718G Building (chemical storage building). Major activities will include removing combustible material, removing chemicals from 3718G Building, conducting asbestos abatement in 3718E Building, and flushing the nitric acid tank located on the west side of the 324 Building. On completion of these activities, a field survey will be completed that lists all remaining radiological and chemical hazards, quantities, and make up.

3.2.3.2 324 Building Heating, Ventilating, and Air Conditioning Subproject

The HVAC subproject activities will isolate the HVAC to the 324 Building. The HVAC is divided into three major areas: the cold side, the hot side, and the process off-gas-vessel ventilation systems.

The major activities associated with the cold side are removing refrigerant (Freon™) and sealing the inlets and outlets from vermin intrusion. The hot side is divided into four zones. These zones have considerable radioactive material holdup, increasing near the 324 Building REC and SMF cells, with the greatest concentrations located in the ducts leading to the A-Frame filters. The highly contaminated ductwork will be cleaned using remote means. The hot side activities are expected to be labor and time intensive. Waste generated from the activity is anticipated to include RH-TRU and LLW (Category 3). The process off-gas ventilation system activities will include removal of all filters and isolation of the electrical connections. Some of the system will require removal because of residual contamination levels inside the ductwork. However, where appropriate, the equipment will be abandoned in place. On completion of this activity, all HVAC will be isolated and de-energized.

3.2.3.3 324 Building Laboratories and Experimental Areas Subproject

The 324 Building Laboratories and Experimental Areas subproject will remove all hazards associated with the following: Laboratory Rooms 22, 22A, and 22B; EDL-101; Room 108 and the 324C Building Addition; EDL-102; the High Bay Addition; Laboratory Room 308/309A; Laboratory Rooms 207 through 212; and the tank pit (Room 1). Former laboratories in Rooms 115 and 207 will also be prepared for transition as a part of this subproject. The laboratories have minimal radiological contamination, but they contain visible chemical residue and potential industrial hazards.

The major tasks associated with this activity are as follows:

- Remove material and combustibles in the chemical storage areas
- Flush and isolate chemical makeup and process tanks
- Decontaminate and isolate fume hoods
- Disconnect electrical power from equipment
- Seal penetrations from vermin intrusion
- Remove/stabilize all hazardous materials
- Clearly define and document the “as left” conditions for all areas.

On completion of the subproject, the laboratories and experimental areas will be free of gross chemical hazards, all penetrations to the outside will be sealed, and all remaining radioactive and hazardous contamination will be stabilized.

3.2.3.4 324 Building Office Area Subproject

The 324 Building Office Area subproject provides for the removal of equipment and combustible material, isolation of utilities and services, and removal or excessing for reuse of mobile offices. The office areas are Administrative Rooms 103 through 107, 109 through 113, 177 through 129, 151 through 195, 202 through 206, 214 through 241, 251 through 295, 301 through 304, and 307; Maintenance Rooms 701 through 706; associated 324 Building corridors; and four mobile office trailers. In addition, equipment in the maintenance rooms will be drained and disconnected from their power sources.

3.2.3.5 324 Building Shielded Material Facility Area Subproject

The 324 Building Shielded Material Facility Area subproject will include removal of radiological hazards associated with the SMF cells. The SMF cells are not so grossly contaminated as the REC; however, the same steps will be followed in performing their deactivation and closure to meet the PMP objectives. The SMF cells, located in the southeast portion of the 324 Building, consist of the airlock cell (Room 141), south cell (Room 140) and the east cell (Room 142). The south, east, and airlock cells are joined, forming an "L," and are surrounded by an operating gallery (Room 139). The first 2.3 meters (from the floor upward) of the cell shielding wall, is constructed of 1.2-meters-thick, high-density concrete. The rest of the cell shielding is constructed of 1.2-meter-thick normal-density concrete. All cells have stainless-steel floors and mild-steel walls with corrosion-resistant coatings.

The steps that will be followed in the deactivation and closure of the SMF cells will include packaging and removal of all equipment and debris, sealing all penetrations to prevent leakage of materials and deactivation fluids, gross decontamination using chemical treatment (e.g., applying dry alkaline foam) or high pressure scarification to all surfaces, and rinsing with water until the desired decontamination factor is achieved. This is anticipated to occur twice for each cell to get to acceptable dose rates. At this point, a coating will be applied to affix loose contamination. Additional activities include removing the remote manipulators and sealing the manipulator penetrations. In addition, the cell liners are expected to require removal to meet the residual contamination goals. Liners will be removed using existing or developed cutting technology, and all generated wastes will be placed into appropriate containers for final disposal.

3.2.3.6 324 Building Stand-Alone Mothballed/Operational Equipment Subproject

The 324 Building Stand-Alone/Mothballed Equipment subproject will allow for mothballing the 4.5-metric-ton bridge crane in Rooms 137 and 138, the 1.8-metric-ton monorail hoist in Room 317, the High Bay elevator, and the main elevator. The subproject activities will allow for the elimination of potential industrial hazards and the isolation of building electrical systems.

Activities associated with mothballing equipment include draining all fluids from the cranes and elevators. After the fluids have been drained, cranes and elevators will be blocked and secured in

place, and the cables and counterweights associated with the elevators will be adjusted to remove tension.

The 324 Building Stand-Alone Operational Equipment subproject provides for the installation of a motor control center and electrical utilities to support long-term S&M activities. On completion of this subproject, the 324 Building will have one control panel on the outside door that can be energized to allow for surveillance of the areas identified as needing access. This subproject will reduce the control point for electricity to one control box, reducing personnel exposure associated with long-term S&M activities.

3.2.3.7 324 Building Support Areas Subproject

The 324 Building Support Areas subproject provides for deactivation of the following: chemical makeup rooms (Rooms 306 and 309), control room (Room 310), Manipulator Shop (Room 147), ventilation equipment room (Room 317), rooms 139A, 139B, 139C, and 139D, and corridors and stairwells adjacent to the REC area.

These areas are mildly to highly contaminated, and they were used to support REC and SMF functions. Activities associated with the subproject will include removing loose material and contaminated equipment. Multiple fume hoods will be wiped down and sealed or removed. In addition, ancillary equipment to the HLV/LLV that are connected to these areas will be removed, or isolated and secured in accordance with the closure plan requirements.

Closure of the manipulator shop will require removal of failed manipulators and the waste compactor, cleanout of the manipulator decontamination chamber, and deactivation of two fume hoods.

Multiple cranes will be drained and placed in an inactive state. Floors and walls will be cleaned and/or sealed to allow reduction in the radiological posting status.

3.2.3.8 324 Building Waste Streams and Utilities Subproject

The 324 Building Waste Streams and Utilities subproject will include activities necessary to deactivate the water, steam, air, vacuum, sanitary sewer, process sewer, fire suppression and detection, telecommunications, RLWS, and compressed gas portions of the piped utilities. By completing this process, all liquid generation and exit points will be isolated.

Utilities (e.g., water, process sewer, and sanitary sewer) will require excavation to isolate predetermined points to allow isolation of the building. Once the lines have been excavated, they will be drained and capped.

All other systems will be de-energized, isolated, and drained (where applicable). On completion of draining or isolation, the systems will be locked out of service and/or physically isolated.

3.3 327 Building Transition Subprojects

The 327 Building Transition subprojects include all the activities required to maintain the safe status of the 327 Building and associated support structures and to perform the deactivation and stabilization tasks necessary to move to a passively safe and environmentally secure configuration, to reduce the nuclear categorization of the facility to “radiological,” and to establish a configuration that will require minimal S&M pending disposition of the buildings. The 327 Building Deactivation Project consists of the following major subprojects:

- 327 Building Safe and Compliant
- 327 Building Small Projects Materials Removal
- Transition 327 Building.

Chapter 6.0 of this document discusses the logic used to link the subprojects and describes the critical path for the overall 327 Building Stabilization/Deactivation Project.

3.3.1 327 Building Safe and Compliant Subproject

The 327 Building Safe and Compliant subproject activities will provide the routine surveillance, operation, and maintenance required for the 327 Building components, systems, equipment and building structures that are needed to protect the personnel, the public, and the environment from potential radioactive and industrial hazardous materials exposure which could be caused by loss of containment/control. This subproject’s activities will be conducted over the life of the buildings, decreasing in magnitude, scope, and costs as the hazards and risks are removed, reduced, and/or stabilized. All other subprojects that are part of the 327 Building Deactivation Project assume that the requirements associated with maintaining the building and their systems, as described and covered by this activity, are met.

The 327 Building contains significant quantities of residual contamination, with the majority of these materials residing inside engineered containment structures. The residual contamination is primarily associated with "hot cell" activities that occurred in the past, involving experiments conducted in a controlled environment with highly radioactive materials. In some cases, the residual material is in a dispersible form and would be susceptible to release in the event of a natural disaster or major loss of building systems. Systems, equipment, and building structures are used to contain these potentially dispersible materials and to minimize their release in the event of an off-normal occurrence. These systems, equipment, and building structures require routine surveillance and preventive measures to ensure that the safety envelope between the managed contaminants and the public, personnel, and environment, is maintained. If system or equipment failures occur, prompt and accurate responses are required. In addition, the 327 Building contains inventories of chemicals and dangerous waste, resulting from past operations and present building deactivation activities. The building contains less-than-90-day hazardous waste accumulation areas, satellite accumulation areas, chemical storage, and make-up areas. Therefore, the building must maintain systems, equipment, and personnel to meet RCRA requirements

for the S&M and closure of RCRA generator facility waste management areas. The building also maintains emergency preparedness and community notification capabilities.

The Safe and Compliant subproject comprises the building's S&M activities required to maintain needed and necessary building systems and structures. The subproject includes required preventive maintenance and calibrations; repair of failed and malfunctioning equipment; walk down of safety systems, equipment, and building grounds (operational surveillance); routine radiological surveys, source checks, and dosimetry; building utilities and assessments; and waste management assessments. The activity also includes management and assessment activities: project direction; management and controls; and environmental, quality, and safety oversight for the minimum safe condition. (Subproject-specific oversight is included in the subproject.) The activity also includes training mandated by OSHA, RCRA, and DOE. Building orientation and building-specific emergency and response training are covered in this activity. The activity also provides safe, secure, and compliant storage of special nuclear materials until final disposition of the material is accomplished. In addition, the activity includes physical security, safeguards accounting and material control, record keeping, studies, evaluations, and assessments.

The Safe and Compliant subproject activities represent the potential mortgage reduction that will be recognized by implementing the waste removal, risk reduction, and deactivation subprojects. Completing waste removal, risk reduction, and deactivation activities will eliminate the drivers behind minimum safe requirements, allowing a reduction in the necessary S&M activities, and thus reducing the resources required to maintain the facility.

3.3.2 327 Building Small Projects Materials Removal Subproject

The 327 Building Small Projects Materials Removal project is the most significant stabilization/deactivation activity being conducted in the 327 Building. Completion of this subproject is a prerequisite to building transition that will result in significant legacy waste removal and radiological risk reduction from the 327 Building. The estimated waste volumes and types (e.g., liquid, solid, LLW, TRU waste) that will be produced during the implementation of each subproject are specified in Appendix B.2, “Waste Forecast.”

The 327 Building Small Projects Materials Removal project is composed of two distinct subprojects, including:

- 327 Building Legacy Waste/Removal
- 327 Building Liquid Waste Handling.

3.3.2.1 327 Building Legacy Waste/Removal Subproject

Fuel characterization activities in the 327 Building resulted in the accumulation of a significant quantity of radioactive material. The Legacy Waste/Fuel Removal subproject includes consolidation and disposal of legacy fuel and materials currently located at the 327 Building. The activity will package

fuel pins and residue material; characterize existing and resultant waste material; and prepare containers for transport to the 200 Area Central Waste Complex. In addition, a significant inventory of waste containers (RH-TRU and LLW "cans") have accumulated inside the hot cells (140 legacy containers as of January 2000). The containers contain paper, plastic, tools, and residual radiological contamination resulting from years of destructive fuel testing and characterization inside the hot cells.

The 327 Building Small Projects Materials Removal subproject covers the specific actions necessary to remove legacy waste from the 327 Building. This task includes the activities required to retrieve, transfer, scan, inventory, segregate, compact, package, transport, and store/dispose the following wastes:

- Metallurgical and non-fissile samples
- Waste buckets from past research and development activities
- Fuel pin tubes
- Three 55-gallon drums and two concrete boxes containing legacy waste.

3.3.2.2 327 Building Liquid Waste Handling Subproject

The 327 Building Liquid Waste Handling subproject will include engineering analysis, design, and physical modifications to the 327 Building RLWS. Previously, the 327 Building RLWS was collected from the point of generation and transferred to the 327 Building basement sump for transfer to the external RLWS piping system, through a series of steam-jet-assisted or gravity-flow lines.

The subproject covers modifications to the building. These modifications include adding piping systems to allow for collection of the RLWS, interim storage until treatment, treatment with a vendor treatment skid, and final load out in bowling ball casks and/or 208.5-liter drums. Final cleanout of the 327 Building RLWS is completed in various other subprojects, including the 327 Building Basement subproject and 327 Building Utilities HVAC subproject.

3.3.3 Transition 327 Building Subprojects

The major tasks to be accomplished by these subprojects include the shutdown/deactivation of all associated equipment and systems and removal and/or stabilization of all radioactive and industrial hazards from the following areas of the 327 Building and structures:

- Building Basement
- Below Grade Structures
- Canyon Deactivation
- HVAC Systems
- Building Exterior and Yard
- Retention Process Sewer (RPS)/RLWS Deactivation
- Support Areas
- Waste Streams and Utilities

- Offices.

As a part of the transition subprojects, a new surveillance lighting control system will be installed.

3.3.3.1 327 Building Basement Subprojects

The 327 Building Basement subproject includes activities necessary to deactivate the 327 Building Cell Filter Room, Mechanical Room, Storage Room, and elevator. The 327 Building basement has significant quantities of abandoned material and equipment that supported activities associated with laboratory experiments in the canyon cells. The basement also contains highly contaminated ductwork and piping associated with the RLWS (which will be dealt with in the 327 Building Utilities and HVAC subproject).

The major activities associated with the 327 Building basement cleanout include removal of loose material and contaminated equipment. On completion, the area will be surveyed and decontaminated as necessary to allow for radiological down-posting. This subproject interfaces with the subprojects that include removal of the RLWS lines and HVAC. Waste generated from the activity is anticipated to be LLW and LLMW, and will be disposed of using 1.2-meter by 1.2-meter by 2.4-meter metal boxes and 208.5-liter drums.

3.3.3.2 327 Building Canyon Subproject

The 327 Building Canyon subproject includes necessary activities to deactivate the following areas in the 327 Building: A-Cell, B-Cell, C-Cell, D-Cell, E-Cell, F-Cell, G-Cell, H-Cell, I-Cell, the canyon, the Decontamination Chamber, the Density Cell, the Dry Storage Carousel, the east and west canyon cranes, the Evaporator cell, the SERF cell, the SERF Storage cell, the SERF nitrogen recirculation and cooling system, the transfer and storage basins, the waste compactor, and the truck lock.

The same methodology will be used to deactivate A- through I-Cells, the SERF cell, and the SERF Storage cell. Deactivation will consist of removing all material from the cells. F-Cell, G-Cell, and SERF cell will require size-reducing activities to remove equipment. In the remaining cells, equipment will be removed through ports in the side of the cells. Once out of the cells, the material or equipment will be moved to A-Cell for processing, segregation, and compaction, then packaged in waste cans, placed in concrete- or lead-lined drums, and disposed of as LLW (Category 1 or 3, depending on curie content). Following removal of cell waste, the cell floor liner will be removed to allow for cell decontamination. Cell decontamination will include applying dry alkaline foam to all surfaces followed by spraying with water. This is anticipated to occur twice for each cell to attain acceptable dose levels. Following decontamination, an epoxy coating will be applied to affix loose contamination. In addition, the remote manipulators will be removed and the penetrations plugged. All

other penetrations will be sealed. Lead block shielding beneath the elevated cells will be removed following cleanout of the cells' exhaust ventilation ducting.

The transfer and storage basins will be drained, and the liquid will be processed to remove radioactive contaminants and then transferred to a mobile tanker trailer for shipment to the 200 Area tank farms. Once the liquid is drained, the storage racks will be reduced in size, packaged, and removed. Finally, the concrete will be decontaminated using wipes or scrabbling, depending on the extent of residual contamination, followed by the application of a fixative (coating).

The waste compactor and truck lock will be deactivated in the same fashion as the 327 Building support areas. All loose materials, equipment, and waste will be reduced in size, packaged, and boxed for disposal as either LLW or MW. Once all the material is removed, the area will be decontaminated and painted to affix any remaining contamination. Support systems will be de-energized and physically isolated.

3.3.3.3 327 Building Utilities and HVAC Subproject

The 327 Building Utilities and HVAC subproject includes activities necessary to deactivate the water, steam, air, vacuum, sanitary sewer, process sewer, fire suppression and detection, telecommunications, RPS/RLWS, and compressed gas portions of the piped utilities. By completing these activities, all liquid generation and exit points will be isolated.

Utilities (i.e., water, process sewer, and sanitary sewer) will require excavation teams to excavate at predetermined points to allow isolation of the building. Once the lines have been excavated, they will be drained and capped.

Lead shielding will be removed and disposed of as MW once the dose rates are reduced to acceptable levels. All other systems will be de-energized, isolated, and drained (where applicable). On completion of draining or isolating, the systems will be locked out of service and/or physically isolated.

The hot side HVAC includes the canyon and cell exhaust. Both areas have plutonium holdup. The highly contaminated ductwork will be cleaned and stabilized using remote means. The activity is expected to be labor and time intensive. Waste generated from this activity is anticipated to be RH-TRU and contact- and RH-LLW (Category 3). Decontamination and affixing agents will be applied to reduce airborne contamination and migration. On completion, systems will be isolated from electrical sources.

The subproject also provides for the installation of a motor control center and electrical utilities to support long-term S&M activities. On completion, the 327 Building will have one control panel on the outside door that can be energized to allow for surveillance of identified areas. The subproject will reduce the control point for electricity to one control box, and reduce personnel exposure associated with long-term S&M activities.

3.3.3.4 327 Building Support Areas Subproject

The 327 Building Support Areas subproject includes activities necessary to deactivate the following areas in and around the 327 Building: exterior and yard, the 3723 Building, the cask storage pad, the Decontamination Room and hallway, the Low Level Laboratory, the Machine Shop, the Manipulator Shop, the Radiological Control Technician office, the dark room, the equipment rooms, the office area (including the kitchen, hallways, and restrooms), the change room area, Burst Test Facility (Room 16), and the storage room.

All loose materials, equipment, and waste will be reduced in size, packaged, and boxed for disposal as either LLW or MW. Once the material is removed, the area will be decontaminated and painted to affix any remaining contamination. Support systems will be de-energized and physically isolated.

Closure for the nonradiological support areas will include removing loose combustible material, vacating office personnel and furniture, and de-energizing support systems.

3.4 Summary

The initial building deactivation subprojects in FY 2000, above minimum safe and waste reduction activities, include activities to identify, isolate, stabilize, and remove building hazards (i.e., chemical, radiological, industrial) from the 324 and 327 Buildings hot cells. Initial phases of building deactivation will require the use of remote systems, including manipulators, cutting systems, specialized tools, cranes, and optics. The building personnel, currently implementing the waste removal and risk reduction subprojects (i.e., 324 Building B-Cell Cleanout, 324 Building A-Cell Cleanout, and 327 Building Legacy Waste/Fuel Removal), are training to become experts in operating equipment in a remote environment, and will be deployed in the future deactivation subprojects. Maintaining continuity of resources is critical to maintaining a trained and highly specialized workforce to ensure the overall project completion dates and financial requirements are met.

The deactivation subprojects assume that the Minimum Safe subprojects for the 324 and 327 Buildings is fully funded. In addition, the 324 and 327 Buildings Deactivation Projects interface with other projects, including the 300 Area Treated Effluent Disposal Facility, solid waste projects, and tank farm projects. These interfaces must be maintained and enhanced to allow the projects to be accomplished in the time specified.

The BOE sheets in Appendix A are based on the as-is conditions within the 324 and 327 Buildings. These BOE sheets were individually reviewed and evaluated by a panel of facility experts and personnel during a series of in-depth workshops. The information provided in the BOE sheets is accurate and correct based on current data and work experience. However, these buildings are complex and supported a variety of projects/programs in the various laboratories and engineering

hot cells. Because of this complexity and because personnel will become more experienced and knowledgeable in the operations and processes associated with deactivation, it is expected that some modifications to the project baseline will be required.

In most cases, enabling assumptions have been used to develop the subproject BOE sheets to provide this revised baseline and identify areas for future definitive analysis. Each BOE sheet contains enabling assumptions, as appropriate. Enabling assumptions are also noted in Appendix B.3, "Issues/Enabling Assumptions." As needed, enabling assumptions will be eliminated through the additional review of historical data, sampling and analysis, and development of technical alternative studies.

Figure 3-1. 324 Building Location Assessment Results.

Figure 3-2. 327 Building Location Assessment Results.

4.0 PROJECT ORGANIZATION

The management organization for the 324 and 327 Buildings Deactivation Projects represents a partnership between three principal project organizations responsible for the project. The three project organizations and their associated summary responsibilities and relationships are described in the following paragraphs.

4.1 U.S. Department of Energy, Headquarters (DOE-HQ)

The DOE-HQ Office of Project Completion (EM-40) and Richland Operations Office (EM-43) are primarily responsible for policy and budget decisions affecting the project. Summary responsibilities for the EM-43 project manager are as follows.

- Act as the point of contact for matrixed DOE-HQ support organizations.
- Act as the final decision authority when project management team decision-making deadlocks occur.
- Participate in quarterly progress reviews.
- Review project scope, cost, and schedule objectives.
- Approve DOE-HQ milestones and project funding.
- Act as the liaison for DOE-HQ organizations and establish proactive communication paths to enhance timely decisions.
- Keep DOE-HQ management informed of project status and obtain direction as necessary.

4.2 U.S. Department of Energy, Richland Operations Office (RL)

Within RL, the Facility Transition Division (FTD) has field responsibility for the project. The FTD Director has appointed a dedicated project manager for the 324 and 327 Buildings Deactivation Projects. The project manager is the primary project interface at RL for DOE-HQ, FH, and RL matrix organizations.

The RL project manager's primary role is oversight rather than daily management of the project. Matrix support is provided to the RL project manager from other RL organizations. Summary responsibilities of the RL project manager are listed below:

- Provide high-level project direction.

- Provide policy guidance and direction to FH.
- Coordinate and approve overall project documentation and control baselines.
- Monitor and review project activities.
- Maintain a proactive single point of contact for matrix support organizations, state and federal regulatory agencies, and other external stakeholders.
- Coordinate approval of project documentation in RL.
- Identify opportunities for improvement and remove barriers to success.
- Work with DOE-HQ to obtain needed approvals/exemptions, and work regulatory interfaces to streamline the regulatory process.

4.3 Fluor Hanford

The PHMC major contractor, FH, is responsible for providing adequate day-to-day project planning; technical management, coordination, control, and reporting of project activities; and integration of project activities with other the Hanford Site PHMC projects. The FH River Corridor Project organization has primary responsibility for stabilization, deactivation, and performance monitoring for the 324 and 327 Buildings Deactivation Projects.

The FH organization for the River Corridor Project is shown in Figure 4-1. The FH organizations for the 324 Building Deactivation Project and 327 Building Deactivation Project are shown in Figures 4-2 and 4-3, respectively. A 324/327 Buildings Project assignment matrix will be maintained for the life of this project.

4.3.1 River Corridor Project Vice President

The FH River Corridor Project Vice President is the overall project director for the transition of the 324 and 327 Buildings. This director plans, coordinates, and directs overall project performance including technical direction, development and administration of project criteria and baselines, system analysis, scheduling, budgeting, configuration management, and reporting. The following summarizes the responsibilities of the River Corridor Project Vice President.

- Provide oversight, review, and approval of project operations.
- Monitor financial performance of projects.
- Ensure project execution excellence.

- Establish a project and operations approval matrix.
- Identify and mentor current and future project managers.
- Manage DOE relations related to specific projects.
- Maintain regular communication with the FH Office of the President and FH Functional Leads.
- In concert with FH Functional Leads and RL, provide integration interfaces within the PHMC and with other Hanford contractors to optimize project support needs and ensure project objectives are not jeopardized due to competing interests/needs.

4.3.2 Project Directors

The 324 Building Deactivation Project Director and the 327 Building Deactivation Project Director coordinate and direct project performance on a daily basis. The directors and project management interface with project field personnel, with the River Corridor Project Vice President, and with their DOE counterparts. The directors will provide guidance for resolutions affecting interfaces and conflicts between subprojects and interfaces with external buildings/companies. The directors also conduct periodic technical status meetings with the project mangers, baseline control manager, River Corridor Project Vice President, and RL program oversight.

The directors and project management will make daily decisions that may affect how project objectives are met, but will escalate selected decisions (at the director's discretion) for confirmation. Decisions affecting the overall project scope, schedule, and budget will require confirmation by the River Corridor Project Vice President and DOE, consistent with change request guidance provided in Chapter 5.0. Issues and communications are intended to flow both ways—up from the project personnel and directors, for action or resolution, and down from DOE and the River Corridor Project Vice President to the project directors and personnel for action or resolution.

The following summarizes the responsibilities of the two Project Directors, working in conjunction with the project managers.

- Execute the projects in accordance with the contract and its scope of work, and ensure the safety of workers.
- Implement the requirements of the FH Management Systems Requirements document, including worker health and safety programs.
- Establish the project baseline.

- Manage and control project baselines, as well as the timely identification and communication of real and potential problems, to the River Corridor Project Vice President and RL project manager.

- Ensure the quality, value, timeliness, and profitability of project execution.

- Develop a plan to accomplish the project objectives in a cost-effective manner using demonstrated innovative technology where appropriate.

4.3.3 324/327 Project Managers

The 324/327 Buildings project managers have the overall responsibility to establish, plan, and execute all the 324/327 Buildings transition subprojects. In conjunction with the functional managers (e.g., Radiological Control Manager, Engineering Manager, Building Manager), the project managers appoint subproject managers, based on technical expertise, project management experience, and availability. The managers provide direction, mentoring, and training to all subproject managers. The managers are also responsible for maintaining schedule performance and monitoring cost control initiatives for the subproject activities within the buildings. In addition, the project managers will ensure the availability of trained and qualified personnel for conducting subproject activities.

4.3.4 324/327 Subproject Managers

Subproject managers are assigned for each of the subprojects discussed in Chapter 3.0. The managers will develop the subproject's technical plan, and in conjunction with the subproject management team (Subproject Manager, Subproject Planner/Scheduler, Subproject Analyst), develop the WBS and the ABC estimate for the subproject. The subproject managers will also develop a performance-based integrated schedule and will approve subproject WBS, estimates, and schedules. The subproject managers will manage the subprojects within the approved schedule and cost baselines, as approved in the MYWP, will identify potential changes to the technical, schedule, and cost baselines, and will approve subproject baseline control changes as appropriate.

The subproject managers will work with other managers and planners to incorporate or negotiate interfaces between subprojects and other programs (i.e., Waste Management Project, Treated Effluent Disposal Facility, Spent Nuclear Fuel Project, etc.). The managers will also incorporate meaningful milestones in the baseline to capture key decision points, completion of planning documents, and logical interim steps required to complete overall subproject milestones, to allow for regular performance (cost and schedule) measurement. In addition, the subproject managers will identify and acquire trained personnel required to implement the in-field activities. The managers will manage the in-field activities within the constraints of the safety basis and quality standards.

Figure 4-1. FH River Corridor Project Organization Chart.

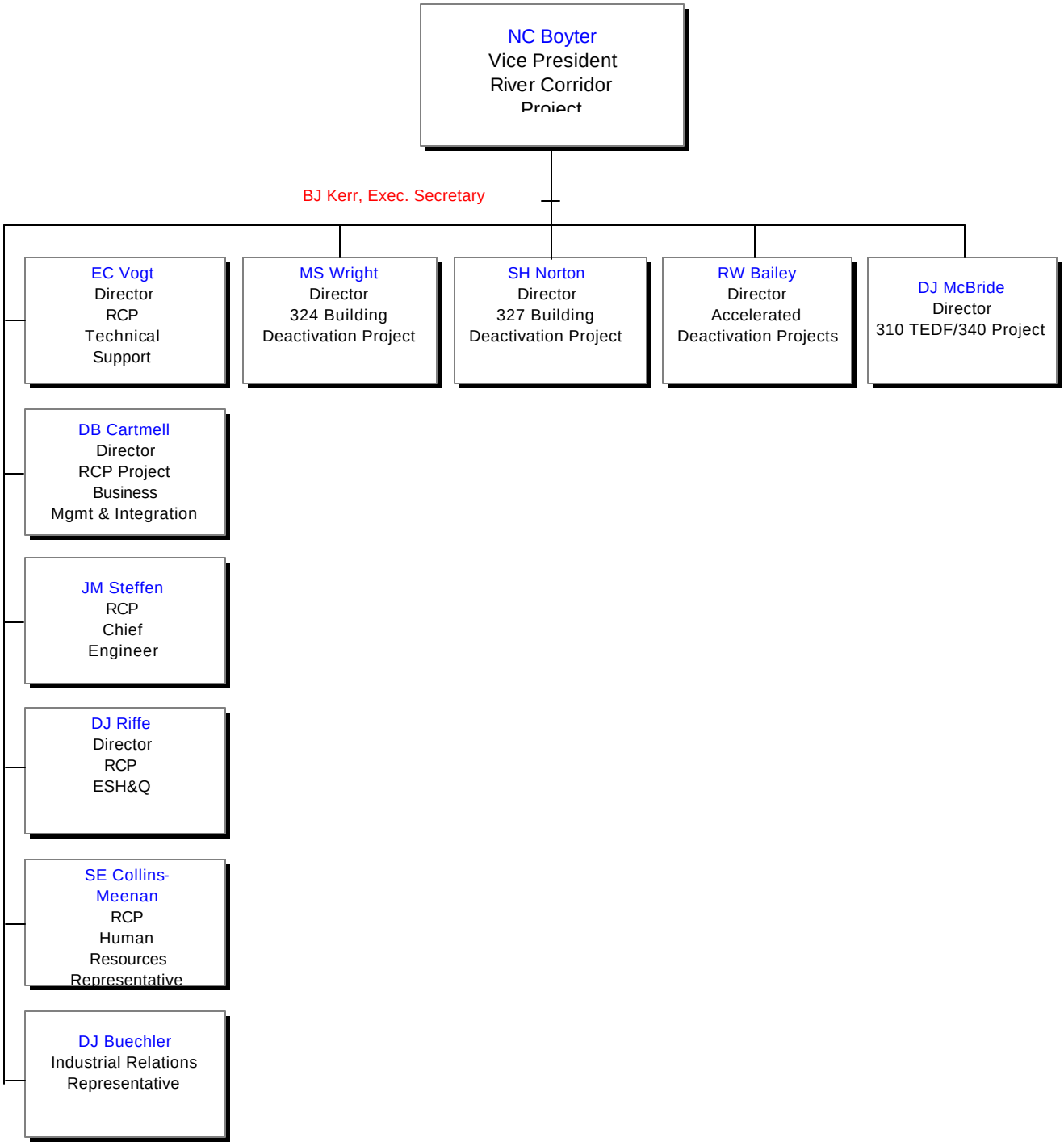


Figure 4-2. 324 Building Deactivation Project Organization Chart.

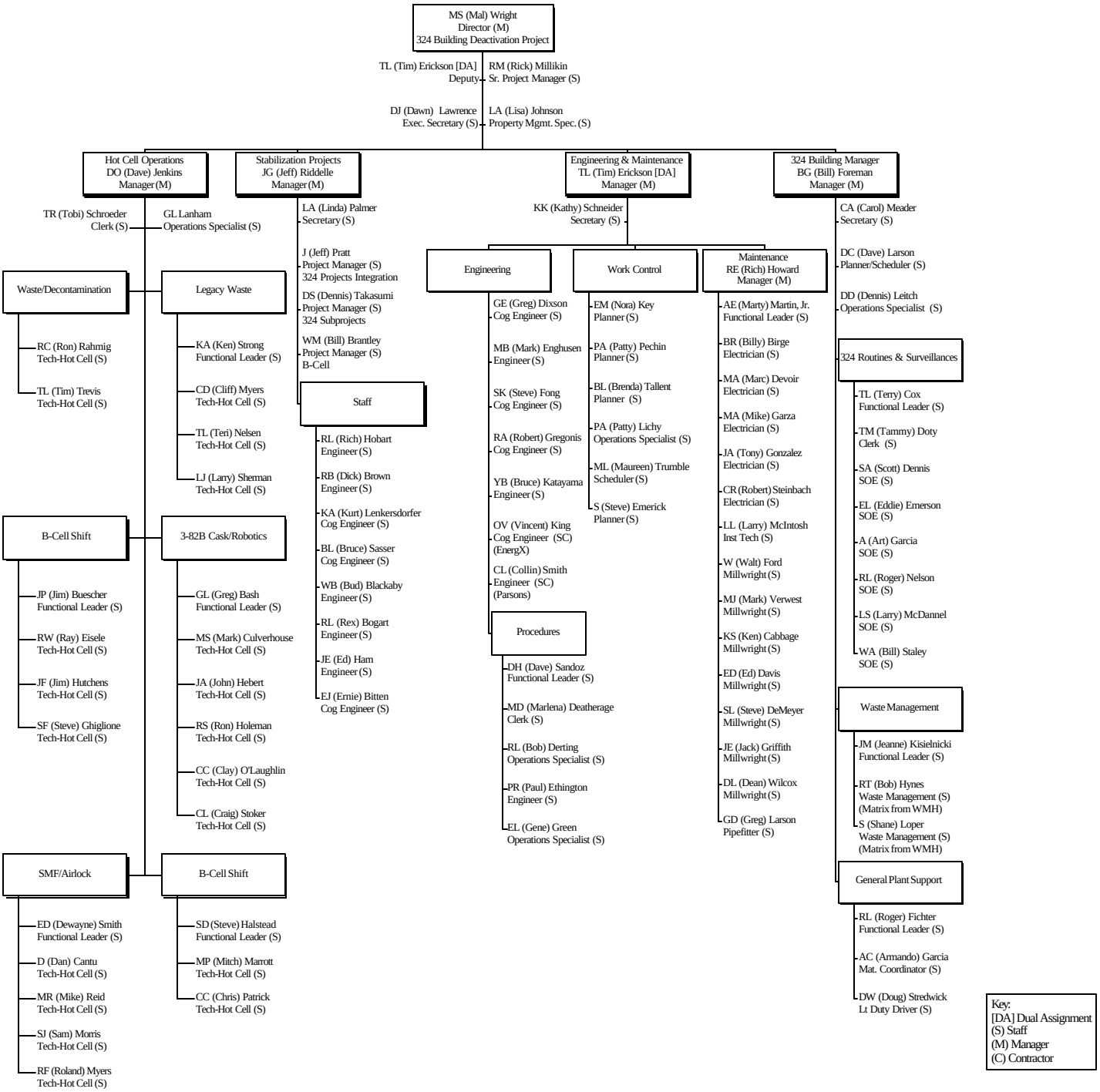
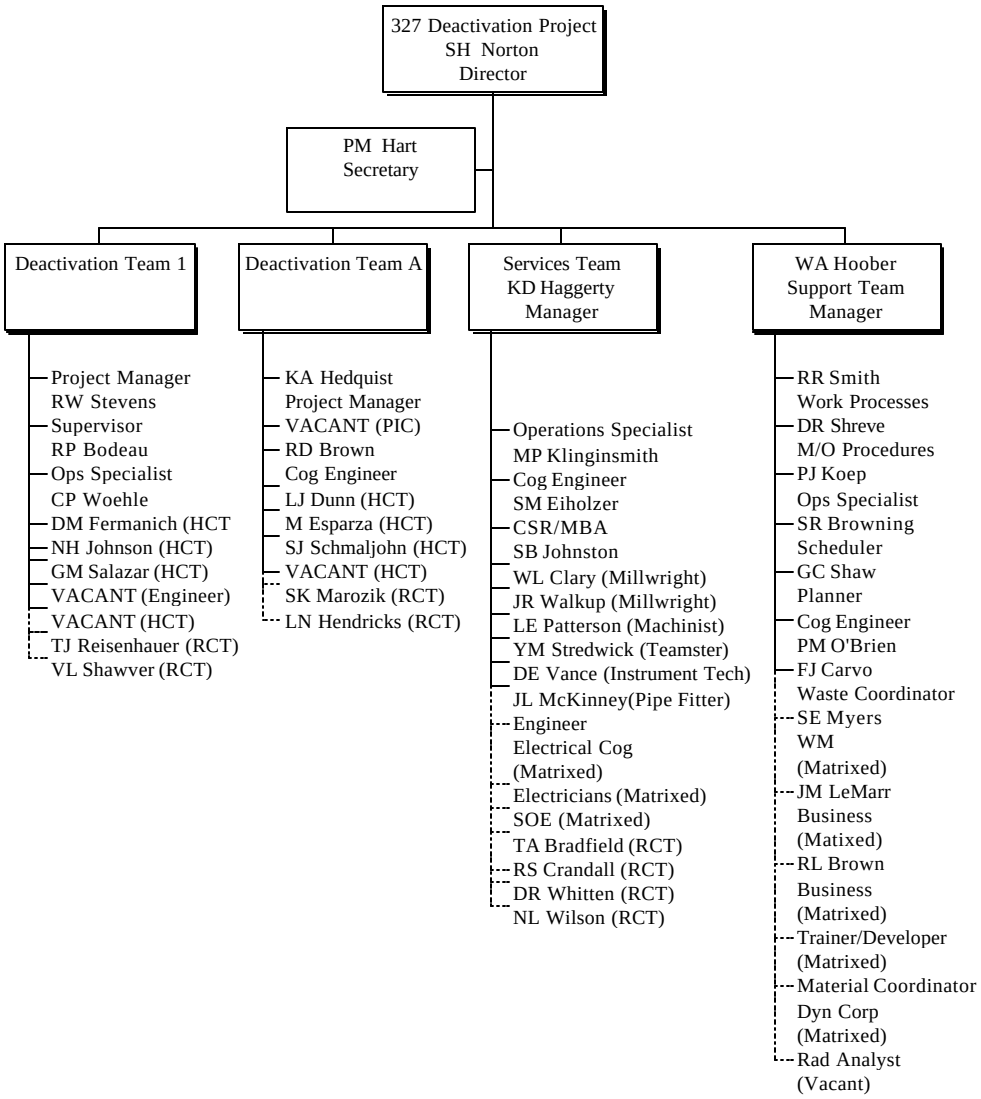


Figure 4-3. 327 Building Deactivation Project Organization Chart.



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5.0 PROJECT MANAGEMENT AND CONTROL

This chapter provides an overview of the Project Management and Control System (PMCS) that will be employed in the management of the 324 and 327 Buildings Deactivation Projects, addressing the following key elements of project management and control:

- Project Management Control System
  - Work breakdown structure
  - Baseline development/update
  - Scheduling
  - Performance measurement and reporting
  - Control of baseline integrity through Change Control administration
  - Scheduling

- Information and reporting
  - Project Director's monthly status review
  - RL/PHMC Senior Management Project Review
  - DOE-HQ/RL Project Management reviews (mid-year/end of year)
  - Special reviews (Hanford Advisory Board, Regulators, Stakeholders, Tribes).

5.1 Project Management Control System

The PMCS for the 324 and 327 Buildings Deactivation Projects is consistent in purpose and scope, and compliant with the direction contained in the PHMC Management and Integration Plan, HNF-MP-001. The primary goal of this management system is to ensure planning and implementation of this project is conducted in a manner that is technically sound, timely, and cost-effective. The PMCS provides a consistent approach to be used throughout the subprojects.

In addition, the system is designed to facilitate an upward flow of integrated, summarized information from the River Corridor Project to FH Senior Management, RL, and DOE-HQ, ensuring that the project team can make timely management decisions, facilitated by the following process:

- Develop an integrated plan and achieve the project objectives in a cost-effective manner using demonstrated and innovative technology where appropriate.

- Establish a WBS that defines the project in a disciplined manner from the top project level to the detailed, manageable work packages. A technical scope of effort and associated schedule and budget are established and responsibility for performance is assigned for each work package.

- Establish controls that ensure that the PMCS is capable of organizing, planning, scheduling, budgeting, accounting, and reporting work in a timely, consistent manner.

- Record technical, schedule, cost, and funding information in the format and to the level of detail necessary to meet management and reporting needs.

- Integrate the captured data to provide meaningful comparison of the project status and progress to planned accomplishments.

- Evaluate and analyze the resulting information; identify key problems that require management decision and corrective actions.

- Correlate the project funding profile with planned commitments, expenditures, and work accomplished to date.

- Prepare and control changes that affect both authorized and planned work scope, budgets, and schedules.

5.1.1 Work Breakdown Structure

The WBS will be developed in accordance with HNF-PRO-518, *Work Breakdown Structure, Index and Dictionary*. The procedure provides for the responsibilities, requirements, and the process for development, review, and approval of the PHMC WBS, index, and dictionary.

The WBS for the 324/327 Buildings Deactivation Projects has been developed to provide a basis for scope definition, resource planning, and project implementation and control. The WBS is based on the combination of two methodologies. The minimum safe subprojects (Chapter 3.0, Sections 3.2.1 and 3.3.1) were developed using a requirements-based approach (i.e., Surveillance, Maintenance, Project Management, Utilities and Assessments). The 324 and 327 Buildings Materials Removal Subprojects (Chapter 3.0, Sections 3.2.2 and 3.3.2) and the Transition 324 and 327 Building Subprojects (Chapter 3.0, Sections 3.2.3 and 3.3.3) are based on a logical flow of activities required to meet desired endpoints.

Endpoint criteria for the 324 and 327 Buildings are addressed Chapter 7.0. When achieved, the transition endpoint criteria and activities will meet the transition mission objectives. The current areas and systems defined in the draft endpoint criteria documents are the major subprojects included in the WBS. Discreet subproject activities are identifiable within the lower level WBS, and linked together (schedule logic) or sequenced-based on the planned order in which the actual work will be completed. Completing endpoint objectives within these subprojects will be defined and traceable through the WBS.

WBS dictionaries have been prepared at the subproject level for inclusion in the MYWP. The dictionaries include a summary-level statement of the technical scope, key milestones, key interfaces, and subproject assumptions. Lower-level WBS dictionaries can be developed at the discretion of the subproject managers.

5.1.2 Baseline Development/Update

Subproject baselines will use the Project Hanford ABC Preparation Template as guidance for developing and documenting baseline activities. The templates reflect the guidance contained in the PHMC procedures governing this effort, which include HNF-PRO-585, *Cost Estimating*, and HNF-PRO-519, *Schedule Development*. The following steps will be used as a guide in developing or updating the project and subproject baselines.

- Develop a subproject baseline or subproject baseline modification by identifying and defining the desired outcomes (endpoints). Define the endpoint in sufficient detail to describe the following:
  - Subproject goal and objectives
  - Major project elements and activities
  - Technical, functional, and regulatory requirements
  - Enabling assumptions
  - Key interfaces and dependencies (intra-, inter-project)
  - Key deliverables and milestones.

- Determine whether the baseline change/addition requires updating the project baseline or multiple subproject baselines, or whether it is a scope change requiring the addition of one or more subprojects.
  - The cost account manager (CAM) communicates the change/update requirements to project control.
  - If a baseline change request (Section 5.1.5) is required, assist in developing the appropriate change control documentation per HNF-PRO-533, *Change Control*.

- Draft the new or modified WBS. Use right-to-left planning (i.e., completion of subtask Z, the project endpoint, requires completion of subtasks X and Y).

- Develop lower level WBS descriptions, assumptions, and alternative approaches to task completion (if appropriate).

- Complete the subproject plan, including technical scope and resource- and timed-phased schedules, using the Project Hanford ABC Estimating Preparation Template.

- Document project scope, cost, and schedule risks. Rank project risks based on an evaluation of potential impact to completing the subproject scope within the regulatory, schedule, and cost baseline (low, medium, and high) (Chapter 12.0). As appropriate, develop a risk management plan including risk mitigation strategies.

On completion of this baseline development and update process, provide a draft to the subproject manager and project control manager for review and approval. The project control manager will determine the appropriate change control level for updating the subproject baseline, River Corridor Project Baseline Summary or MYWP, and/or potential impacts to the Hanford Site Strategic Plan.

When required, the change will be processed to the appropriate authority via the River Corridor Project Change Control Board.

5.1.3 Scheduling

Developing and maintaining the project schedule will be in accordance with HNF-PRO-519, *Schedule Development*. The subproject management team will develop subproject schedules at a level that allows for performance measurement and decision making (i.e., inter- or intra-subproject prioritization). Developing and maintaining the schedules includes assessing the impact of factors, such as delays, equipment failures, procurement lead time, productivity, resource availability constraints, and facility outages. In addition, the project critical path will be identified and maintained on a real-time basis. The subproject CAM or subproject manager, assisted by the assigned scheduler, will maintain updated schedules daily, weekly, or monthly, to effectively manage and integrate inter- and intra-subproject activities. The subproject management team will define issues and concerns that may affect key milestones, performance agreements, and higher level deliverables (i.e., DOE requests, Tri-Party Agreement milestones, Defense Nuclear Facilities Safety Board actions, etc.), or affect the critical path of the Project or Level I Subproject. The CAM, project manager, and scheduler also will develop subproject corrective action plans as required.

5.1.4 Performance Measurement and Reporting

The subproject manager will communicate subproject technical issues and accomplishments, schedule performance, cost and schedule issues, and corrective action plans, as appropriate, in the weekly "Path Forward" meeting. The official record of performance measurement for a reporting subproject is provided by the performance measurement system. This information is contained in the Hanford Data Integration system called HANDI, available via the Hanford Local Area Network. The performance measurement system, an earned value system, compares the resource-loaded schedules (budgeted cost of work scheduled [BCWS]), the actual cost of work performed (ACWP), and the actual work completed (budgeted cost of work performed [BCWP]), monthly. The CAM, subproject analyst, and scheduler meet with the subproject manager near the end of the reporting period or the fiscal month, to determine the status of work in progress or scheduled to start during the month, based on the earned value assigned to each activity. This effort results in the monthly BCWP.

Following the final month-end processing of actual cost within INSIGHT, the subproject analyst generates performance reports that will compare BCWP to BCWS and ACWP, to determine the cost and schedule variances based on current month and fiscal year-to-date data. After review and analysis within the management team, the data will be presented in a monthly report at the subproject or sub-subproject level, based on complexity and resource levels of the project activities (cost variance BCWP – ACWP and schedule variance = BCWP – BCWS).

In addition, the project manager, CAM, and analyst will develop an estimate at completion (EAC), beginning no later than March, for the current fiscal year activities and out-year life-cycle

activities, if required. The EAC will be based on detailed analysis of performance data and subproject manager's assessment of variances, performance, and any relevant changes to baseline scope. The EAC will be evaluated at the two-digit cost element level. (The one-digit cost element includes labor, materials, and contracts. The two-digit cost element detail includes type of labor, type of material, etc.) Development of the EAC should be an ongoing process, with updated information provided from daily, weekly, or monthly reviews with the subproject management team.

Performance reporting will be in accordance with the FH Management and Integration Plan, as augmented by specific instruction or guidance issued by Site Planning & Integration.

5.1.5 Change Control

Baseline change control will be developed and administered in accordance with HNF-PRO-533, *Change Control*. The procedure provides guidance for baseline change control responsibilities. It also defines requirements for management, administration, and use of the technical, schedule, and cost baseline control system, including the process for preparing and implementing the baseline change request (BCR).

5.2 Information and Reporting

Management reporting provides timely and accurate data to apprise the River Corridor Project Director, FH Senior Management, and DOE management of current and projected project conditions. Information contained in these reports is obtained from the same database that supports day-to-day management of the River Corridor Project.

5.2.1 Project Director's Monthly Status Review

Reporting for the 324 and 327 Buildings Deactivation Projects is incorporated in the monthly data set, prepared by each subproject manager for the River Corridor Project Director and the RL project manager. The Monthly Status Review summarizes performance and compares it with the technical, schedule, and cost baselines contained in the MYWP. The report provides the data required by the DOE-HQ process (the Performance Tracking System).

5.2.2 RL/PHMC Senior Management Project Status Review

The FH and RL senior management will conduct a monthly project status review. The review will focus on items of significant interest, as determined by the FH Vice President of Operations, and include a review of accomplishments since the last meeting; expected accomplishments for the next month; major problems and issues facing the project; and current cost, schedule, and technical status.

5.2.3 RL/DOE-HQ Project Management Reviews

Throughout the project, RL will schedule regular (typically semiannually) DOE-HQ project management review meetings. The appropriate personnel from DOE-HQ, RL, FH, and the River Corridor Project will attend the reviews.

The River Corridor Project will be responsible for preparing and issuing the agenda and recording action items, agreements, and commitments that result from the meeting. Semiannual reviews focus on significant accomplishments since the previous meeting; expected accomplishments for the next quarter; major problems and issues facing the project; and current cost, schedule, and technical status.

5.2.4 Special Reviews

As required, RL, FH, and the River Corridor Project will conduct special-topic project meetings to review progress, review issues and action items requiring management decisions, change actions, and other items as necessary. Special reviews include status to the stakeholders (i.e., Hanford Advisory Board, Inter-Agency Management Integration Team [IAMIT], Project Management Meeting with Ecology, etc.).

6.0 SUMMARY BASIS OF ESTIMATE

Chapter 6.0 includes summary-level detail describing the project WBS, schedule, deactivation logic, costs, project integration data, and metrics. The 324 and 327 Buildings Deactivation Projects are currently scheduled to be complete in FY 2007. The schedule could be expedited by completing more activities in parallel and/or increasing work shifts. (However, some subprojects already include three-shift operations.)

6.1 Work Breakdown Structure

The WBS hierarchy for the 324 and 327 Buildings Deactivation Projects is presented in Figure 6-1, and is further described in Table 6-1. The detailed WBS dictionaries/BOE sheets are provided in Appendix A. The 324 and 327 Buildings Deactivation Projects are broken down into six primary project areas (the minimum safe subprojects, Chapter 3.0, Sections 3.2.1 and 3.3.1; the 324 and 327 Buildings Materials Removal subprojects, Chapter 3.0, Sections 3.2.2 and 3.3.2; and the Transition 324 and 327 Buildings subprojects, Chapter 3.0, Sections 3.2.3 and 3.3.3). The project areas are further broken down into major subprojects. The major subprojects are composed of individual task packages, which are described in detail in the Appendix A BOE sheets. The subproject responsibility assignments and resource-loaded schedules are detailed in Appendices B-5 and C-3 respectively.

6.2 Schedule Summary

Summary-level project logic diagrams have been prepared, at the subproject level, for both the 324 and 327 Buildings (Figures 6-2 and 6-3). In addition to the project logic, a summary level schedule is also provided for both the 324 and 327 Buildings (Figures 6-4 and 6-5). All project activities are scheduled to be completed by September 2007.

Major existing milestones within the project management software associated with these schedules are presented in Table 6-2 and 6-3. Table 6-4 provides a description of the DOE-RL and above milestones for both 324 and 327 Buildings. Additional milestones will be developed in conjunction with the MYWP.

Project-level metrics have been developed to track, manage, and control project progress. The metrics are presented in Table 6-5 and include a brief description of the metric and its purpose. In addition, project-level and other metrics, related to specific work scope, will be developed in conjunction with the MYWP. The metrics will be updated throughout the life of the project.

A brief description of the 324 and 327 project schedules and their associated critical paths are provided in the following sections.

6.3 Critical Path Schedule

Critical path for any project is defined as the longest time path through a network from the initial project activity to the final project completion milestone. It is the chain of activities that controls the overall project completion time. It is by definition the series of activities in a logic network with the least amount of total float. The critical path method in project management is most valuable as project measurement tool, when the critical path chain is defined by hard logic or hard interface constraints between the subproject activities. In the event that a project is comprised of multiple differing subprojects, where there are few physical or hard interfaces, each subproject may have a critical path within the subproject, and the overall critical path would be constrained by human or financial resources.

Due to the complexity and differing nature of the 324/327 Buildings subprojects, and multiple subproject/fiscal year critical paths (due to enforceable agreement milestones and funding constraints), this project may contain a multitude of critical path combinations that allow for project completion, based on the baseline schedule. Since each subproject contains end dates that are intermediate to the project end date, the critical path is defined by critical subprojects or subproject activities within the schedule with minimal float (Figures 6-2 and 6-3). The schedule presented in Appendix C-3 depicts all subproject activity networks, with critical path activities highlighted in red. By intentional design of the schedule, multiple critical paths indicated by the subprojects are indicated to heighten the awareness of both the project team and the stakeholders of the importance of the intermediate goals, and constraints, as well as overall project completion.

6.3.1 324 Building Critical Path

The critical path for the deactivation of the 324 Building has been determined to start with the deactivation of the B-Cell within the REC, which is currently ongoing. The critical path is scheduled to complete with the endpoint closure of the 324 Building stand-alone equipment and fire detection and suppression system in September 2006**.**

Stabilization and deactivation of the 324 Building is currently ongoing. With the exception of the 324 Building REC Closure Phases I through IV Subprojects, all other stabilization work within the building is expected to be completed prior to the beginning of deactivation. Stabilization subprojects include completion of the packaging and shipment of the cesium chloride material (previously stored in D-Cell), which was completed in early FY 1999, as required to complete Tri-Party Agreement Milestone M-94-02. In addition, the equipment removal subproject from A-Cell was also completed.

The current critical path within the B-Cell project is the completion of the size reduction of the 1A Rack. The activities required to perform these size reduction evolutions are removal of the jumpers, moving the equipment into position for size reduction, cutting the equipment up for disposal, and the packaging and disposal of the equipment. After each rack is removed, the dispersibles under the rack must be collected, packaged, and prepared for disposal. Following rack size reduction and disposal activities, the B-Cell dispersibles on the floor will be collected and containerized. The B-Cell floor will then be vacuumed.

Following removal of the B-Cell dispersibles, gross cleanout of the sludge in the pipe trench will proceed. This supports the objective of source term reduction while enabling the installation of piping to support the new Liquid Waste Handling System (LWHS) operation. In parallel (on the critical path), the spent nuclear fuel will be packaged and removed from B-Cell. The cell cleaning operations will proceed once the fuel is removed and the LWHS is operational.

Cell cleaning operations will proceed in stages with gross cleaning conducted first, followed by final liquid decontamination. If required, liner removal and concrete remediation will follow. Duct cleanout from the REC cells to the A-Frame filter will be conducted between the gross cleanout operations and the final liquid decontamination. For the REC cells, B-Cell cleanout is on the critical path. However, since the work will be accomplished in functional steps (i.e., all gross decontamination is done first for each cell, then each cell will undergo final decontamination), each of the other cells are parallel near-critical path activities as well. The final pipe trench cleanout and airlock decontamination are the final steps in the REC deactivation operations.

Although not on the critical path, an extremely complex parallel operation will be the deactivation of the piping, LLV, and HLV. The final flushes will be performed on the lines leading to the HLV and the LLV. All tanks and lines in the HLV and LLV will be flushed, once liquid decontamination operations are underway. After the HLV and LLV line and tank flushes are complete, deactivation work will continue in these systems. The final deactivation of C-Cell, which is planned to house the LWHS to process the decontamination solution from the closure/deactivation activities within the REC, will proceed in parallel with the removal of the LLV/HLV tanks and the final airlock decontamination.

After the REC and SMF (not currently on critical path) are deactivated, the contaminated/potentially contaminated HVAC system can be deactivated. This will include the isolation of the inputs into the system, removal of the high-efficiency particulate air (HEPA) filters, and the removal and capping of the ductwork from the systems to the outlet of the HEPA filters. Some of the filters and ductwork must be removed to reduce the source term within the building for final deactivation. The cold side of the HVAC system will be deactivated. The cold side HVAC system does not contain contamination, so the equipment will be abandoned in place, and will require shutting down of the supply fans, sealing the system from weather and vermin intrusion, and removing any hazardous materials. After the building HVAC systems are secured, the remaining equipment on the roof will be shut down and isolated. This equipment will also be abandoned in place, the openings will be sealed from weather and vermin intrusion, and any hazardous materials will be removed. Also following the HVAC systems deactivation, the support areas and equipment can be deactivated, including the maintenance and manipulator repair shops, the cask handling area, truck lock, building cranes, and elevator. These activities are not currently on the critical path for building deactivation.

The last systems to be deactivated will be the building utilities, which include the steam and water supply, the sanitary and process sewer systems, and the fire detection and suppression systems. These systems will be isolated from outside the building, and the lines will be cut and capped at the

points where they meet up to the main site headers. This activity is required to prevent freezing problems on any dead legs on the lines. Inside the building, the utilities will be drained of all water to prevent freezing problems because there will be no heat supplied to the building following deactivation.

Other activities that are currently outside the critical path, but have hard logic ties as to when they must be deactivated, are the electrical system deactivation, and the installation of the surveillance lighting system. Depending on adjustments made due to budget or resource constraints, these activities may be pushed to the critical path in the future.

6.3.2 327 Building Critical Path

The critical path for the deactivation of the 327 Building begins in FY 2001, with the deactivation of G-Cell within the building canyon area, and is scheduled to be complete on September 7, 2007, with the endpoint closure of the 327 Building fire detection and suppression system subproject.

Deactivation of the 327 Building is currently scheduled to start at the beginning of FY 2001. Due to budget constraints, the required funding is not expected to be available until that time to commence with the deactivation activities. The current work that is being performed that will impact the deactivation of the building is scheduled to be completed in FY 2000. The work includes the packaging and disposal of the legacy waste buckets. In FY 1998, 240 waste buckets were disposed, and another 134 were disposed of in FY 1999. Other activities within the building are the furnace testing and fuel sectioning to support the Spent Nuclear Fuel Project and the transfer of the fuel back to the Hanford Site K-Basins. This work scope was completed in FY 1999. The 327 LWHS will begin design and construction in FY 2001 and will be completed in FY 2002. This system must be in place prior to commencing the hot cell decontamination activities, to process and dispose of the water and cleaning agents that will be used for cell cleanout. The 327 Building pin tubes will be packaged into lead-lined drums and disposed of in FY 2002. The remaining legacy waste buckets and dry storage/metallurgy mount samples will be packaged and disposed of in FY 2003. This will complete the removal of legacy waste materials and fissile inventory in the facility, which is required prior to deactivation.

The deactivation of the building begins with the canyon hot cell deactivation. The sequence for these deactivations currently is I-Cell, H-Cell, E-Cell, D-Cell, F-Cell, G-Cell, B-Cell, SERF cell, C-Cell, dry storage, and finally, A-Cell. Once the building canyon cells are deactivated, the cell exhaust system will be shutdown.

The activities required for the shutdown, cleanout, and deactivation of the 327 Building canyon hot cells include removal of the waste material, isolation of the cell utilities, internal decontamination of the cell, sealing the cell HVAC and cell access ports, and removal of the cell manipulators. It was determined that A-Cell would be the last cell to be deactivated, because all the waste removed from the other cells will be transferred to A-Cell where the waste bucket compactor and waste drum loading system are located. C-Cell is also used for waste bucket segregation, a factor in the determination that C-Cell should be one of the last cells to be shutdown. The remainder of the cells can be performed in any order. I-Cell deactivation is scheduled first, because it is one of the cleanest cells and will provide

the opportunity to establish the process for cell decontamination and isolation before deactivation of one of the more difficult cells. However, the cells can be sequenced in any order to accommodate the needs of the building.

After the canyon cells are isolated, the cell HVAC system can be deactivated. The activities include the isolation of the cells from the system, removal of the cell HEPA filters, and removal and capping of the ductwork from the cell to the outlet of the HEPA filters. The filters and ductwork must be removed in order to reduce the source term within the building for final deactivation. Following the shutdown of the cell exhaust system, the canyon support areas will be deactivated. This work encompasses cleanout of the canyon galleries, manipulator shop, and the water basin. The cold side HVAC system will be deactivated. It does not contain contamination, so the equipment will be abandoned in place. This will require shutting down the supply fans, sealing the system from weather and vermin intrusion, and removing any hazardous materials. After the building HVAC systems are secured, the remaining equipment on the roof will be shut down and isolated. This equipment will also be abandoned in place, and the openings will be sealed from weather and vermin intrusion, and any hazardous materials will be removed.

The last system to be deactivated will be the building utilities, which include the steam and water supply, the sanitary and process sewer systems, and the fire detection and suppression systems. These systems will be isolated from outside the building, and the lines will be cut and capped at the points where they meet up to the main site headers. This activity will be done to prevent any freezing problems on dead legs on these lines. Inside the building, the utilities will be drained of all water to prevent freezing problems because there will be no heat supplied to the building following deactivation.

Other activities that are currently outside the critical path, but have hard logic ties as to when they must be deactivated, are the waste compactor, truck lock, RPS/RLWS, electrical system deactivation, and installation of the surveillance lighting system. Depending on adjustments made due to budget or resource constraints, these activities may also be pushed on to the critical path in the future.

6.4 Cost Summary

Summary level costs, by fiscal year, are provided in Table 6-6. Costs are presented first as a rollup for the six primary project areas and then are further broken down into the individual subprojects. Additional cost details are provided in Appendix A (BOE sheets). It is currently estimated that a total cost of approximately $227 million is needed to complete the Minimum Safe, Stabilization, and Deactivation work scope scheduled from October 1999 through September 2007, with a maximum annual budget of approximately $35 million required.

6.5 Contingency Background Information

Historically, cost and schedule contingency has not been formally applied to expense-funded activities at the Hanford Site. Recently, the DOE published guidance for the development of contingency analysis and application of budget and schedule contingency for expense-funded projects. Hard contingency has not been applied to subprojects within this PMP on prior submissions of the 324/327 baseline. At this point in the development of the cost and schedule baseline, addition of either appropriate budget or schedule contingency would not support milestones currently in existence between the DOE and the regulators (Tri-Party Agreement Milestones M-89 and M-92) due to the limited funding available at the Hanford Site. Subsequent to the March submittal of the PMP (Revision 1.0), management was requested to review the activities with the highest risk from a technical/implementation perspective and to add schedule duration in order to ensure the highest degree of confidence in the baseline possible. This resulted in adding duration and resources (approximately $8.5M) to areas affecting the 324 Building piping and vault tank closure processes. During preparation of this revision (and in Change Request 17 submitted in FY 1999), this "soft contingency" has been used to offset estimate changes based on the completion of technical studies, upgrade to the technical baseline, and development of enabling assumptions pending resolution of technical decision points.

The revised baseline was built on currently approved requirements, procedures, and processes. Changing requirements will be a reality throughout the implementation of the baseline. Due to this and the potential for major impacts (both positive and negative) from the requirements change evolution, a requirements analysis was conducted and tied to each of the affected functions (WBS elements). If a requirement is challenged for waiver, an engineering analysis and budget analysis can be documented through the baseline change system. Each change will be evaluated to determine the impact of removal of the requirement on all effected functions/elements. Because the requirements are primarily approved through a rigorous process (e.g., S/RIDs, Safety Analysis Report, Tri-Party Agreement, *National Environmental Policy Act of 1969* [NEPA], etc.) or are mandated by law, the re-baseline effort could not assume the success of a challenge process. Allowances for such an effort (i.e., requirements challenge) are provided to enhance the overall confidence in the life-cycle schedule, since all documented efficiencies gained through this effort will be applied to the acceleration of workscope and/or "catch-back" schedules. Of course, all efficiencies and application of potential savings will be documented through the appropriate level of change control.

It is the intent of the project managers to aggressively pursue continued planning detail upgrades and management of budget/schedule impacting decision points. It is anticipated that closure of these decision points in most cases will provide for more efficient and/or breakthrough processes that will allow for the steady accumulation of project contingency in the form of increasing project total float. In addition, the project is aggressively pursuing further reductions in the non-stabilization/deactivation functions to increase resource availability for acceleration of the upgraded baseline.

6.6 Project Integration

Project internal and external interfaces have been identified and integrated into the project baseline. Appendix B-2 provides fiscal year waste forecasts by subproject and waste type.

Table 6-1. Summary Work Breakdown Structure.

Project-Level Summary.

WBS	Subproject	Description
1.04.10.01.01	324 Building Safe and Compliant	Minimum activities required to maintain the 324 Building safety basis, nuclear material security, regulatory compliance, and provides for overall Project management.
1.04.10.02.01	327 Building Safe and Compliant	Minimum activities required to maintain the 327 Building safety basis, nuclear material security, regulatory compliance, and provides for overall Project management.
1.04.10.01.05	324 Building Materials Removal	Consolidation, processing, packaging, removal, and disposal of legacy wastes within the 324 Building (i.e., B-Cell, noncompliance waste, cesium, etc.) for RCRA closure of the 324 REC.
1.04.10.02.05	327 Building Materials Removal	Consolidation, processing, packaging, removal, and disposal of legacy wastes within the 327 Building (i.e., noncompliance waste, 327 Building Legacy Fuel, cesium, etc.).
1.04.10.01.07	324 Building Transition	Activities required to meet the objectives and endpoints for the 324 Building deactivation.
1.04.10.02.07	327 Building Transition	Activities required to meet the objectives and endpoints for the 327 Building deactivation

324 Building Safe and Compliant.

WBS	Subproject	Description
1.04.10.01.01.04.01	324 Building Deactivation Project Management/Oversight	Provides for management oversight and direction and ES&H and QA oversight.
1.04.10.01.01.04.03	324 Building Deactivation Project Training	Provides for building and site-specific training.
1.04.10.01.01.04.05	324 Building Deactivation Project Development and Control	Provides for baseline development and control.
1.04.10.01.01.04.07	324 Building Surveillance	Provides for operational and radiological surveillances in the 324 Building. Provides for steam, electricity, water, pest control, and other 324 Building assessments.
1.04.10.01.01.04.09	324 Building Maintenance	Provides for maintenance of the safety basis, revision and upgrades of the building procedures and configuration management.
1.04.10.01.01.04.11	324 Building Safeguards and Security	Provides for nuclear material security.

327 Building Safe and Compliant.

WBS	Subproject	Description
1.04.10.02.01.07.01	327 Building Deactivation Project Management/Oversight	Provides for management oversight and direction and ES&H and QA oversight.
1.04.10.02.01.07.03	327 Building Deactivation Project Training	Provides for building and site-specific training.
1.04.10.02.01.07.05	327 Building Deactivation Project Development and Control	Provides for baseline development and control.
1.04.10.02.01.07.07	327 Building Surveillance	Provides for operational and radiological surveillances in the 327 Building. Provides for steam, electricity, water, pest control, and other 327 Building assessments.
1.04.10.02.01.07.09	324 Building Maintenance	Provides for maintenance of the safety basis, revision and upgrades of the building procedures and configuration management.
1.04.10.02.01.07.11	324 Building Safeguards and Security	Provides for nuclear material security.

Table 6-1. Summary Work Breakdown Structure (continued).

324 Building Remove Materials Subprojects.

WBS	Subproject	Description
1.04.10.01.05.10.05	324 Cesium Cleanout Project	Completes removal of the cesium powder and pellets and Nordion capsules from 324 Building.
2.04.01.01.07.02	A-Cell Equipment Removal	Provides for 100% verification and repackaging of waste containers transferred to the PHMC from PNNL. Containers are considered suspect LLMW due to presence of prohibited articles.
1.0410.01.05.01.	324 Building B-Cell Cleanout (Closure Plan Phase I)	Completes the B-Cell Cleanout subproject. Refurbish and modify the 324 Building RLWS for decontamination fluids and removes the SNF from the facility.
1.04.10.01.05.02	324 REC Closure Plan Phase II	Completes REC Closure Plan Phase II
1.04.10.01.05.03	324 REC Closure Plan Phase III	Completes REC Closure Plan Phase III
1.04.10.01.05.04	324 REC Closure Plan Phase IV	Completes REC Closure Plan Phase IV

327 Buildings Remove Materials Subprojects.

WBS	Subproject	Description
1.01.10.02.05.07.07	327 Building Liquid Waste Handling	Refurbish and modify the 327 Building RLWS for decontamination fluids.
1.04.10.02.05.07.03	327 Building Legacy Waste	Completes the removal of waste containers within the hot cells in 327 Building transferred to the PHMC from PNNL, removal of all non-K-Basin fuel pieces from the 327 Building.

324 Building Transition Subprojects.

WBS	Subproject	Description
1.04.10.01.07.04	324 Building Exterior and Yard; HVAC; Labs and Experimental Areas; Office Area; SMF; Standalone Mothballed Equipment; Surveillance Lighting; Support Areas; Waste Streams and Utilities.	Activities required to meet the objectives and endpoints for the 324 Building deactivation.

327 Building Transition Subprojects.

WBS	Subproject	Description
1.04.10.02.01.07	327 Building Basement Area; Canyon Deactivation; Support Areas; Waste Streams and Utilities	Activities required to meet the objectives and endpoints for the 327 Building deactivation.

Table 6-2. 324 Building RL and Above Milestones.

Table 6-3. 327 Building RL and Above Milestones.

Table 6-4. 324/327 Buildings Milestone Descriptions.

TYPE	WBS	Activity description	Milestone Ctrl. #	Early finish
HQ	1.04.10.01.01.04.05.01	M92-13 Submitt 300 Area SCW PMP	TRP-00-902	29SEP00*
HQ	1.04.10.01.01.04.05.01	M-92-14 Complete Phase I Special Case Waste	TRP-02-901	30SEP02*
HQ	1.04.10.01.01.04.05.01	M-92-15 Complete Phase II Special Case Waste	TRP-02-901	30SEP04*
HQ	1.04.10.01.01.04.05.01	M92-16 Complete Phase 3 Special Case Waste	TRP-06-901	29SEP06*
RL	1.04.10.01.01.04.05.01	Select Tech. for 324 Cell Liner Int. Assessments	TRP-01-901	27-Apr-01
RL	1.04.10.01.01.04.05.01	Select Tech. for Debris Rule Verif. at 324	TRP-01-902	29-Mar-01
RL	1.04.10.01.01.04.05.01	Select RCRA Closure Method 324 Building Piping	TRP-01-942	27-Sep-01
RL	1.04.10.01.01.04.05.01	Select Tch. for Char & Removal Contam Piping 324	TRP-03-901	27-Jun-03
RL	1.04.10.01.01.04.05.01	Select Tech. for Rad. Liquid Waste Proc. 324	TRP-03-902	28-Mar-03
RL	1.04.10.01.01.04.05.01	Select Technologies for Duct Cleaning & Removal	TRP-04-902	15-Apr-03
RL	1.04.10.01.01.04.05.01	Select Tech. for Piping Intg. Assessment 324	TRP-04-903	28-May-04
RL	1.04.10.01.01.04.05.01	Select Tech. for Highly Contam. Tank Rmvl. 324/7	TRP-04-904	8-Feb-02
RL	1.04.10.01.05.01.03.09	1A 3-82B Cask Shipments Complete	TRP-99-907	5-May-00
RL	1.04.10.01.05.01.03.11	Containerize Dispersible under 2A Rack Complete	TRP-99-933	19-Apr-00
RL	1.04.10.01.05.01.03.11	2A Rack Size Reduction Complete	TRP-99-936	11-Apr-00
RL	1.04.10.01.05.01.03.11.0G	2A Rack 3-82B Shipments Complete	TRP-99-909	14-Feb-01
HQ	1.04.10.01.05.01.03.19	Complete TPA M89-02	TRP-99-901	30-Nov-00
RL	1.04.10.01.05.01.05.03	SNF Assemblies/Rods Packaging & Removal Complete	TRP-03-911	21-Mar-03
RL	1.04.10.01.05.01.07.03	SCW Shipments to Storage Site Complete	TRP-00-931	30-Nov-00
RL	1.04.10.01.05.01.09.03	B-Cell Cleanout Project Complete	TRP-01-913	27-Oct-05
RL	1.04.10.01.05.01.09.03	RL Approve Closure Report (Phase I)	TRP-01-916	26-Oct-05
RL	1.04.10.01.05.01.09.03	Submittall of Closure Plan Certif-PE CERTIF	TRP-01-945	14-Oct-05
RL	1.04.10.01.05.01.09.03	B-Cell Liner Removal Visual Inspection-PE CERTIF	TRP-01-943	10-Feb-05
RL	1.04.10.01.05.01.15.07	324 LWHS System Ready for Use	TRP-00-915	30-Sep-03
RL	1.04.10.01.05.02.03.01.0Z	RL APPROVE CLOSURE REPORT (PHASE II)	TRP-05-916	25-Oct-05
RL	1.04.10.01.05.03.01.01	RL Approve Closure Report (Phase III)	TRP-04-916	1-Sep-05
HQ	1.04.10.01.05.04.05.01.1V	TPA M-89-00 Cmplt Close of NonPermitted MW Strg	TRP-00-901	27-Oct-05
RL	1.04.10.01.05.04.05.01.1V	RL Approve Closure Report (Phase IV)	TRP-05-918	27-Oct-05
RL	1.04.10.01.05.04.05.01.2A	Final Deactivaiton HLV Complete	TRP-05-917	19-Jan-05
RL	1.04.10.01.07.04.17.13	324 Deactivation Complete(to see critical const)	TRP-06-921	22-Sep-06
HQ	1.04.10.02.01.07.05.01	M92-13 Submitt 300 Area SCW PMP	TRP-00-902	29SEP00*
HQ	1.04.10.02.01.07.05.01	M-92-14 Complete Phase I Special Case Waste	TRP-02-901	30SEP02*
HQ	1.04.10.02.01.07.05.01	M-92-15 Complete Phase II Special Case Waste	TRP-02-901	30SEP04*
HQ	1.04.10.02.01.07.05.01	M92-16 Complete Phase 3 Special Case Waste	TRP-06-901	29SEP06*
RL	1.04.10.02.05.07.03.01.23	MET Mount/DS Sample Disposition Complete	TRP-03-922	30SEP03*
RL	1.04.10.02.05.07.03.07.31	327 Legacy Waste Drum Shipping/Disposal Complete	TRP-02-923	11-Aug-03
RL	1.04.10.02.07.07.01.01	Radiological Basement Area Deactivation Complete	TRP-05-924	30-Dec-03
RL	1.04.10.02.07.07.02.13	327 Below Grade Structures Deactivation Complete		8-Aug-06
RL	1.04.10.02.07.07.03.09	327 Canyon Deact Complete	TRP-06-926	8-Aug-06
RL	1.04.10.02.07.07.04.13	327 SERF Deactivation Comp		27-Dec-06
RL	1.04.10.02.07.07.05.37	327 Support Area Deactivation Complete		7-Sep-07
RL	1.04.10.02.07.07.07.39	327 Utility Deactivation Complete		7-Sep-07
RL	1.04.10.02.07.07.07.39	327 Deactivation Complete	TRP-07-930	07SEP07*
RL	1.04.10.02.07.07.09.05.0N	327 Building RPS/RLWS Deactivation Complete		25-Apr-07

RL	1.04.10.02.07.07.11.01	327 HVAC Deactivation Complete	TRP-07-929	2-Apr-07

Table 6-5. Project Metrics[1].

Metric Title	Description	Purpose
Buildings Deactivated	This metric will track the progress on the total number of structures or buildings deactivated associated with the 324 and 327 Buildings Deactivation Projects. The number of buildings will be developed based on structures/buildings with unique numbers as tracked on the Hanford Site property management tracking system. Buildings will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A baseline will be represented on the graphic that is consistent with the PMP integrated schedule. Completion of a facility requires that the planned activities required to meet the end-points have been completed.	Metric required for the Hanford Site Technical Baseline.
Square Meters Deactivated	This metric will track the progress on the total number of square meters deactivated associated with the buildings referred to above. The estimate of square meters will be based on overall dimensions of areas to be deactivated. Square meters will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A baseline will be represented on the graphic that is consistent with the PMP integrated schedule. Completion of an area requires that the planned activities required to meet the endpoints have been completed.	Senior-level management overview tool. Progress measurement and goal-oriented graphic for building employees.
Curie Reduction	This metric will track the progress on the total number of curies removed/fixed associated with the buildings referred to above. The estimation of residual curies will be based on the supporting appendices: 324 Building Radiological Characterization Report; 327 Building Radiological Characterization Report; and can be modified as additional analysis is completed. Curies will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A baseline will be represented on the graphic that is consistent with the PMP integrated schedule.	Track progress towards radiological risk reduction.
End Points	This metric will track the progress on end-point closure. The End-Point to BOE crosswalk provides a baseline of end-points to be completed in any given fiscal year. End-Points will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A baseline will be represented on the graphic that is consistent with the PMP integrated schedule. Completion of end-points will be demonstrated by submittal of the closeout packet to BHI.	Senior-level management overview tool. Progress measurement and goal-oriented graphic for building employees.
Cost Variance	Budget and Actuals will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A life-cycle baseline will be represented on the graphic that is consistent with the PMP integrated schedule. (See Chapter 5.0 for monthly analysis).	Senior-level management overview tool.
Schedule Variance	Budget and Actuals will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A life-cycle baseline will be represented on the graphic that is consistent with the PMP integrated schedule. (See Chapter 5.0 for monthly analysis).	Senior-level management overview tool.
Waste Volume Forecast	This metric will track the progress of stabilization and deactivation subprojects, based on waste generated versus waste forecasted, to be generated during subproject activities. In addition, this metric will track the accuracy of waste volume estimates and waste minimization/avoidance. Waste volumes (both solid and liquid) will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A baseline will be represented on the graphic that is consistent with the PMP integrated schedule.	Required for the Hanford Site Technical Baseline. Excellent secondary measure of project performance.
Overtime	This metric will track the use of overtime. Planned and actual overtime will be tracked on the y-axis and fiscal years will be tracked on the x-axis. A baseline will be represented on the graphic that is consistent with the PMP integrated schedule.	Building and project manager tool to track and trend overtime

[1] Initial project-level metrics will be tracked and reported quarterly. The metrics will be established within 45 days of the approval of the PMP (and subsequent revisions) and will be updated throughout the life of the project. Additional metrics related to the specific work scope, to be conducted in any given fiscal year, will be developed in conjunction with the Multi-Year Work Plan submittal, prior to the initiation of the fiscal year. In addition, 'critical few' metrics, involving safety and health-related data and radiological program measures, will continue to be tracked under their respective programs.

Metric Title	Description	Purpose
		versus deactivation progress. Excellent secondary measure of project performance.
Total Float	Total float for the life-cycle schedule will be tracked on the y-axis and fiscal years will be tracked on the x-axis.	Senior-level management overview tool.
Total Operating Efficiency	This metric is a composite of a number of specific factors leading to an overall operational efficiency for working in the hot cells. Each factor will be tracked, allowing incremental improvements in operational efficiency to be documented.	Senior-level management overview tool.

Table 6-6. Summary Cost Table.

TP-08 Baseline Change Request
Impacts by Level 5 WBS and Fiscal Year

Baseline Change Request Profile

WBS Level 5	WBS Level 5 Title	Data Sum of FY00	Sum of FY01	Sum of FY02	Sum of FY03	Sum of FY04	Sum of FY05	Sum of FY06	Sum of FY07	Sum of Total
1.04.10.01.01	Maintain Safe & Compliant 324 Bldg.	$13,382,068	$12,632,193	$11,862,047	$10,418,346	$8,577,117	$4,015,647	$1,604,595		$62,492,013
1.04.10.01.05	Remove Materials from 324 Building	$13,997,053	$14,897,622	$16,155,409	$11,722,395	$9,139,990	$8,741,555			$74,654,023
1.04.10.01.07	Transition 324 Bldg.				$739,353	$5,362,382	$6,764,706	$6,240,936		$19,107,378
	1.04.10.01 Total	$27,379,121	$27,529,815	$28,017,456	$22,880,093	$23,079,489	$19,521,908	$7,845,531		$156,253,413
1.04.10.02.01	Maintain Safe & Compliant 327 Bldg.	$6,719,107	$5,102,459	$5,073,011	$4,625,902	$4,361,749	$3,524,729	$2,921,226	$1,457,317	$33,785,500
1.04.10.02.05	Remove Materials from 327 Bldg.		$1,251,891	$1,382,937	$2,947,110					$5,581,938
1.04.10.02.07	Transition 327 Bldg.				$2,063,576	$8,047,598	$7,521,096	$8,373,890	$5,063,615	$31,069,776
	1.04.10.02 Total	$6,719,107	$6,354,350	$6,455,948	$9,636,588	$12,409,347	$11,045,826	$11,295,116	$6,520,932	$70,437,214
	Grand Total	$34,098,228	$33,884,165	$34,473,404	$32,516,682	$35,488,836	$30,567,734	$19,140,647	$6,520,932	$226,690,628
	Escalation		$673,263	$1,392,989	$2,013,612	$3,017,494	$3,355,961	$2,545,706	$1,023,786	$14,022,811
	BCR Escalated Total	$34,098,228	$34,557,428	$35,866,393	$34,530,294	$38,506,330	$33,923,695	$21,686,353	$7,544,718	$240,713,439

Fiscal Year 2000 MYWP Baseline

WBS Level 5	WBS Level 5 Title	Data Sum of FY00	Sum of FY01	Sum of FY02	Sum of FY03	Sum of FY04	Sum of FY05	Sum of FY06	Sum of FY07	Sum of TOTAL
1.04.10.01.01	Maintain Safe & Compliant 324 Bldg.	$13,107,947	$13,314,121	$12,771,037	$12,930,204	$9,782,108	$8,478,801	$6,384,999	$3,579,134	$80,348,351
1.04.10.01.05	Remove Materials from 324 Building	$11,880,906	$12,426,744	$10,563,302	$6,965,355	$8,571,767	$4,013,796	$191,219		$54,613,089
1.04.10.01.07	Transition 324 Bldg.		$18,882	$3,329,295	$3,229,799	$4,136,718	$5,301,804	$3,228,820	$1,290	$19,246,608
	1.04.10.01 Total	$24,988,853	$25,759,747	$26,663,634	$23,125,358	$22,490,593	$17,794,401	$9,805,038	$3,580,424	$155,608,048
1.04.10.02.01	Maintain Safe & Compliant 327 Bldg.	$6,489,628	$6,971,935	$6,963,956	$7,364,191	$4,987,686	$4,869,635	$3,703,017	$2,055,501	$43,405,549
1.04.10.02.05	Remove Materials from 327 Bldg.		$1,320,046	$956,656	$789,753					$3,066,455
1.04.10.02.07	Transition 327 Bldg.					$6,952,188	$4,588,340	$7,369,001	$4,407,499	$23,317,028
	1.04.10.02 Total	$6,489,628	$8,291,981	$7,920,612	$8,153,944	$11,939,874	$9,457,975	$11,072,018	$6,463,000	$69,789,032
	Grand Total	$31,478,481	$34,051,728	$34,584,246	$31,279,302	$34,430,467	$27,252,376	$20,877,056	$10,043,424	$223,997,080
	Escalation		677,000	1,398,000	1,934,000	2,925,000	2,991,000	2,777,000	1,577,000	$14,279,000
	MYWP Escalated Total w/o Carryover	$31,478,481	$34,728,728	$35,982,246	$33,213,302	$37,355,467	$30,243,376	$23,654,056	$11,620,424	$239,676,080
	FY 1999 Carryover (1.04.10.01.05)	$1,400,000								$1,400,000
	MYWP Total w/Carryover	$32,878,481								$241,076,080
	Delta By Fiscal Year (escalated)	**$1,219,747**	**-$171,300**	**-$115,863**	**$1,316,992**	**$1,150,863**	**$3,680,319**	**-$196,703**	**-$4,075,706**	**$1,037,359**
									Percent Change:	**0.43%**

This BSWS profile incorporates the revised FY 2000 planning rates to reflect restructuring but does not include the proposed transfer of indirect cost elements to direct accounts.

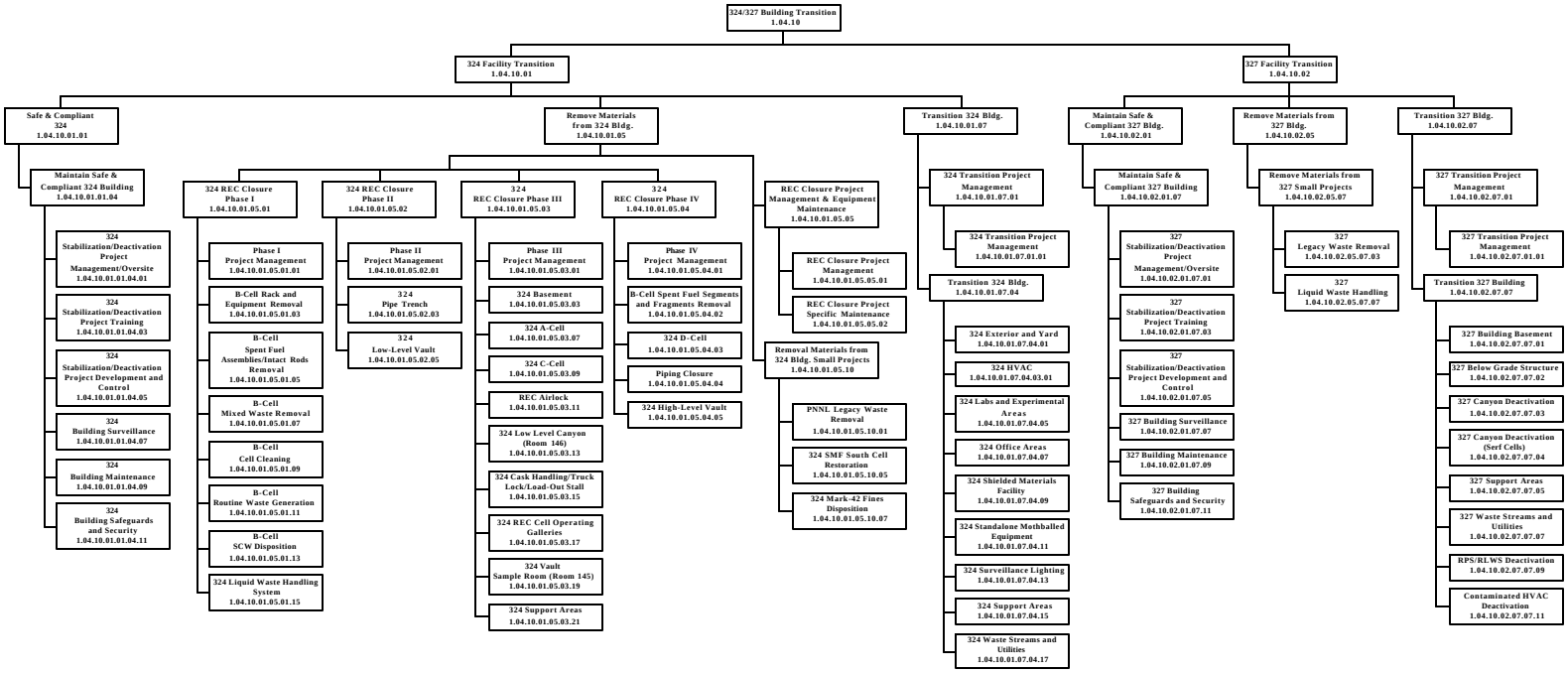
Reconciliation Table

RLWBS	HANDI WBS	MYWP	BCR	Delta
1.04.10.01.01	1K4M	$80,348,341	$62,492,013	-$17,856,338
1.04.10.01.05	1K4B/1K4S	$56,013,089	$74,654,023	$18,640,934
1.04.10.01.07	1K4Z	~~$19,246,608~~	~~$19,107,378~~	~~-$139,230~~
	324 Total	$155,608,048	$156,253,413	$645,365
1.04.10.02.01	1K7M	$43,405,549	$33,785,500	-$9,620,049
1.04.10.02.05	1K7S	$3,066,455	$5,581,938	$2,515,483
1.04.10.02.07	1K7Z	$23,317,028	$31,069,776	$7,752,748
	327 Total	$69,789,032	$70,437,214	$648,182
	Total	$225,397,080	$226,690,628	$1,293,548
	Escalation	$14,279,000	$14,022,811	-$256,189
	Grand Total	$239,676,080	$240,713,439	$1,037,359

* Includes FY 1999 carryover in MYWP/BCR totals.

Figure 6-1. WBS Hierarchy

300 Area River Corridor Project Work Breakdown Structure
HNF-IP-1289, Rev. 1A
Figure 6-1. WBS Hierarchy



January 11, 2000

Figure 6-2. 324 Building Deactivation Subproject Logic Diagram.

Figure 6-3. 327 Building Deactivation Subproject Logic Diagram.

Figure 6-4. 324 Building Summary Schedule (P3).

Figure 6-4. 324 Building Summary Schedule (P3) continued.

Figure 6-4. 324 Building Summary Schedule (P3) continued.

Figure 6-5. 327 Building Summary Schedule (P3).

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7.0 ENDPOINTS

Chapter 7.0 describes the endpoint development principles and methodology, administration, closure, and turnover package for the 324 and 327 Buildings Deactivation Projects.

7.1 Background

The endpoint method for the 324 and 327 Buildings Deactivation Projects will follow the DOE-HQ guidance, published in DOE/EM-0318, Rev. 0, U.S. Department of Energy, Office of Environmental Management, *Facility Deactivation Guide—Methods and Practices Handbook - Emphasizing End Points Implementation*. The methods of defining endpoints for facility transition were proven extremely effective at the PUREX and B Plant facilities for planning work and interacting with the regulators and environmental restoration contractors responsible for post-transition S&M.

The endpoint method is a logical process of determining final conditions for each building, system, and space. The final conditions are based on stated objectives, likely task types, and expected future uses for the systems and spaces.

7.2 Endpoint Development Principles

The following guiding principles form the foundation of the endpoint process.

- The decision to create an endpoint should be driven by, and clearly linked to, top-tier program objectives, not feasibility or capability.

- The endpoint condition of the 324/327 Buildings Deactivation Projects should reflect a fundamental safety approach, involving three layers of protection: elimination of hazards, effective building containment, and building monitoring and control.

- Endpoint decisions are integrally linked to decisions (and constraints) on resources and methods. Cost effectiveness is important.

- Successful endpoint development requires ownership by all affected organizations, including project planners, plan implementation personnel, and the ultimate customers.

- Personnel in the field need clear, quantitative endpoints, and cannot work effectively with vague or functional objectives.

- Endpoint development is an iterative process. Some endpoint decisions may have to be revisited as the stabilization proceeds.

7.3 Endpoint Development Methodology

Every endpoint is driven by a project objective, defined for the 324 and 327 Buildings Deactivation Projects as presented in Chapter 2.0.

7.3.1 Endpoint Development for Stabilization

Task types are the classes of tasks that take the building from an existing state, with hazards and conditions resulting from a lifetime of operation, to a deactivated state. For stabilization, the following task types are used throughout the endpoint development process:

Hazards. Nuclear and non-nuclear activities include removing, repairing, and isolating systems associated with chemical, radiological, or industrial hazards.

Radiation Fields. Activities include removing, shielding, documenting, and ensuring the proper radiological posting of remaining radiation areas.

Contamination. Activities include decontaminating, isolating, fixing, documenting, and ensuring the proper radiological posting of the contamination areas.

Waste. Compliance with regulations and requirements generates activities that include removing, flushing, excessing, and disposing of waste.

Isolation and Containment. Activities include blanking, plugging, covering, removing, screening, and sealing.

Monitoring and Control. Activities required to support the future S&M of the building and minimize the cost, risk, and hazards involved. Examples are instrumentation and providing surveillance lighting.

Refurbishing or Installation. Activities include structural repairs, roof sealing, and modification of the building ventilation system.

Documentation and Labeling. Activities cover the documentation and labeling for the specific space or system.

7.3.2 Endpoint Development for Deactivation

The 324 and 327 Buildings are made up of spaces and systems, for which endpoints need to be established. The spaces and systems are classified by their intended deactivated condition, into the following categories:

Internal Spaces, Routine Access Required. A space inside the building that will require access for surveillance.

Internal Spaces, No Access Expected. A space inside the building that will not require access for surveillance. These spaces, however, can be accessed if the proper precautions are taken.

External Spaces, Including Building Exterior Envelopes. Areas that are assigned to the building and are in direct contact with the environment.

System–Operational. Systems that support the building and will remain operational.

System–Mothballed. Building systems that will be prepared for future reuse by the environmental restoration contractor.

System-Abandoned in Place. Building systems that will be left in place after the assigned end points have been completed.

The endpoint methods are not intended to be prescriptive, but are to be adapted to suit the specific needs of the building being stabilized. Detailed endpoints for the 324 and 327 Buildings are contained in endpoint specification documents for each building (HNF-2119, *324 Building Endpoints*, and HNF-2118, *327 Building Endpoints*).

7.4 Endpoint Administration

Completion and verification of the 324 and 327 Buildings' endpoints by RL's facility transition contractor (FH) and RL's environmental restoration contractor (Bechtel Hanford, Inc. [BHI]) is required to complete the building transition phase and initiate the S&M phase of the decommissioning process. A memorandum of agreement will be required to delineate and transfer responsibilities for the future S&M activities associated with the 324 and 327 Buildings. The memorandum of agreement will also describe the building conditions, including environmental, safety, and outstanding regulatory concerns.

7.5 Endpoint Closure

The endpoint documents have grouped the building spaces and systems into a number of manageable areas. The areas are closely related to the engineering work plans that guide completion of many of the endpoints. Endpoint closure methods and practices are provided in Appendix D-4.

On completion of an endpoint, an FH field representative will initial complete on the field copy of the endpoint document. A BHI field representative will verify acceptable completion of the applicable activity. Verification may be performed by reviewing documents, letters, photos, work

packages, or work plans, or by visual inspection. When all the endpoints for a specific area of the building have been completed and verified, designated FH and BHI management will sign for completion and acceptance of that area. A filing system will be used for storing the documentation closing endpoints.

7.6 Administrative Endpoints and Turnover Package

Administrative endpoints are a compilation of identified supporting documentation for the transition of the 324 and 327 Buildings into the Surplus Facilities Program. An endpoint has been assigned to the documents for tracking and verification only. The compilation includes those documents that are required by law, the Tri-Party Agreement, or DOE Orders, or have been identified by building management, RL, or BHI.

Additional supporting documentation is included under the requirements of a turnover package. The turnover package activities support the physical "hands on" documentation required to perform future surveillance entries and audits and to assist disposition planning (e.g., final Radiological Surveys and maps). Turnover package items are addressed in the endpoints for the specific space or system where the requirement applies. A turnover package consists of the following items:

- Essential diagram drawings required to support S&M and facility disposition activities
- Certified vendor information
- Chemical and hazardous substance inventory
- Deactivation work plans
- Description/photos of spaces to be routinely surveyed
- Final radiological surveys and maps
- Radiological Control Technician routine
- Industrial space hazards identified
- Operational systems waste accumulation areas identified
- Structural and roof studies
- Fire hazard analysis requirements
- Compliance with the Hazards Communication Program
- Compliance with the Asbestos Control Program
- Compliance with the Confined Space Program
- Waste characterization data for waste that was removed as a part of deactivation.

8.0 QUALITY ASSURANCE

Chapter 8.0 provides an overview description of the Quality Assurance (QA) program associated with the 324 and327 Buildings Deactivation Projects.

8.1 Quality Assurance Program Description

The QA program was established in accordance with the requirements of 10 Code of Federal Regulation (CFR) 830.120, *Quality Assurance Requirements* (for nuclear safety affecting activities) and DOE Order 414.1A, *Quality Assurance* (for non-nuclear safety affecting activities).

A detailed description of the QA program is provided in the RL-approved Quality Assurance Program Description, HNF-MP-599, Rev. 3, *Project Hanford Quality Assurance Program Description* and its implementation plan, HNF-SP-1228, Rev. 1, *Quality Assurance Program Implementation Plan*. Other limited QA requirements, stemming from applicable portions of federal and state laws, DOE Orders, standards, and directives, are documented as contractual commitments in facility S/RIDs.

8.2 Quality Assurance Program Structure and Development

The QA program is implemented through a combination of Project Hanford procedures and facility-specific procedures, using a risk-based graded approach, which is defined in HNF-PRO-259, *Graded Quality Assurance*. The specific Project Hanford and facility-specific procedures that implement the QA Program are identified in Project and Facility Quality Assurance Program Plans (QAPPs). These QAPPs are maintained in accordance with HNF-PRO-261, *Quality Assurance Program Plans*.

Effectiveness of the implementation of the QA program is assessed through a combination of independent assessments and management assessments. Independent assessments are performed by the FH Performance Assurance organization. Management assessments are performed by facility management in accordance with HNF-PRO-246, *Management Assessment* and HNF-IP-1264, *324/327 Facilities Stabilization Projects Administration Manual*, Section 2.10, “Management Assessment Program.”

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9.0 REGULATORY AND ENVIRONMENTAL STRATEGY

The following paragraphs summarize the regulatory framework and management strategy for the 324 and 327 Buildings Deactivation Projects. Significant environmental drivers include RCRA, the Tri-Party Agreement, the *Clean Air Act of 1955*, the *Clean Water Act of 1977*, the *Safe Drinking Water Act of 1974*, NEPA, and the *National Historic Preservation Act of 1966*.

9.1 RCRA Status/Strategy

The RCRA, as amended (42 U.S. Code 6901 et seq. and implemented in Washington State through *Washington Administrative Code* [WAC] 173-303, "Dangerous Waste Regulations"), regulates the generation, transportation, storage, treatment, and disposal of solid and hazardous waste. The RCRA provisions govern cleanup of hazardous waste constituents released to the environment from hazardous or solid waste management units.

The process for RCRA compliance throughout the 324 and 327 Buildings transition is to apply the process described in the Sixth Amendment, Section 6.0, "Treatment, Storage, and Disposal Unit Process," of the Tri-Party Agreement. A RCRA Part A, Form 3, identifies the following four TSD units at the 324 Building:

- 324 Sodium Removal Pilot Plant
- Biological Treatment Test Facilities
- Thermal Treatment Test Facilities
- Physical/Chemical Treatment Building.

Each of these units has been closed under procedural closure, as described in the Tri-Party Agreement's Section 3.3.

Mixed waste was generated and stored in certain nonpermitted areas of the 324 Building for longer than the 90-day limit for nonpermitted facilities. Instead of negotiating a Part A, Form 3, for the nonpermitted MW unit (REC, HLV, and LLV), milestones were identified in the Tri-Party Agreement to establish a process to take these areas to closure. During 1996, RL and Ecology met to define the boundaries of the nonpermitted MW unit requiring closure actions. These agreements are documented in the closure plan administrative record, *Summary of Agreements Reached during the Data Quality Objectives Process: 324 Building*. The closure plan, DOE/RL-96-73, identifies how the nonpermitted MW units will be closed. Additional discussions with the regulators will be conducted as necessary to agree on specifics for closure.

The 327 Building contains no TSD units. Therefore, only the generating facility requirements of RCRA apply.

9.2 Tri-Party Agreement Milestones

Although the 324 and 327 Buildings are non-key facilities, a PMP, a building transition endpoint criteria document, and an S&M plan, will be provided as identified in Section 8.0 of the Tri-Party Agreement, to facilitate the transition process and turnover to BHI (Chapter 7.0, Section 7.4).

Milestones were developed for the 324 Building during 1994 and were issued in the Tri-Party Agreement in July 1995. The milestones addressing the 324 Building are contained in the M-89 milestone series and milestone M-20-55. Only two of the milestones remain uncompleted. Additional Tri-Party Agreement milestones to which the 324 and 327 Buildings Deactivation Projects activities contribute, but do not necessarily complete, include several milestones in the M-92 series. The applicable milestones include the following:

M-20-55 Submit Closure Plan for the 324 REC/HLV to Ecology by December 30, 1995. This action is complete.

M-89-00 Complete Closure of Nonpermitted MW Units in the 324 REC, HLV and LLV. A completion date will be established immediately following Ecology approval of the REC, HLV and LLV closure plan (DOE/RL-96-73). Completion date has been established as October 2005.

M-89-02 Complete removal of the 324 Building B-Cell MW and equipment, by November 30, 2000, per change number M-89-98-03.

M-89-05 Complete 324 Building SCW Assessment in support of 324 Building closure by June 1998. This action is complete.

M-92-04 Complete transfer of all 300 Area cesium and strontium to the Waste Encapsulation and Storage Building (WESF) and/or an approved storage location by December 1998. This action is complete.

M-92-12 Complete acquisition of new facilities, modification of existing facilities, and/or modification of planned facilities necessary for consolidated storage prior to disposal of Hanford Site 300 Area Special-Case Waste (SCW). Completion date of September 2006.

M-92-13 Submit 300 Area SCW PMP to Ecology pursuant to Agreement Action Plan, Section 11.5, by September 2000.

M-92-14 Complete removal and transfer, and initiate storage of Phase I 300 Area SCW and materials by September 2002. (Phase I inventory will consist of, at a minimum, one-third the total curie content of all 300 Area SCW.)

M-92-15 Complete removal and transfer and initiate storage of Phase II 300 Area SCW and materials by September 2004. (Phase II inventory will consist of, at a minimum, half the remaining curie content of 300 Area SCW.)

M-92-16 Complete removal and transfer and initiate storage of Phase III 300 Area SCW and materials by September 2006. (Phase III inventory will consist of any remaining 300 Area SCW, wastes and materials.)

The 327 Building contains no TSD units. Therefore, no Tri-Party Agreement milestones will be developed for the transition of this building.

9.3 Clean Air Act Status/Strategy

Section V of the Clean Air Act, adopted in the 1990 amendments to the Clean Air Act, establishes a federal permitting program that will be administered by the states. Any "major source" of criteria pollutants or hazardous air pollutants will be required to obtain a permit to operate the source.

All new activities, construction, or modifications at the 324 and 327 Buildings, that have the potential for increasing radioactive air emissions or emitting new radionuclides, are required to be evaluated to determine if a notice of construction needs to be developed. The 324 Building submitted the following notices of construction for various activities:

- Approval of cleanout of B-Cell, 324 Building, with the State of Washington, Department of Health (WDOH)
- Remediation of the HLV tanks, consisting of processing the liquid waste in Tanks 104, 105 and 107, with the WDOH and the U.S. Environmental Protection Agency (EPA)
- Approval to store the 324 Building B-Cell cleanout material in the PUREX Storage Tunnels, with the WDOH and U.S. Environmental Protection Agency (EPA) (June 1996 shipments)
- Installation of a fume hood in the 324 Building to conduct soil melting experiments using a plasma arc, with the WDOH
- Approval to modify the 324 Building Zone III exhaust ventilation system, and reconfigure lab and increase fume hoods from 10 to 19 units, with Ecology
- Construction of a large walk-in fume hood containing a plasma-arc furnace and an off-gas system, with the WDOH, EPA, and Ecology.

Activities at the 324 Building covered by the preceding notices of construction have been completed. A notice of construction application is being developed for upcoming facility deactivation activities, including the 324 LWHS, which is currently in design, with construction/installation planned for FY 2000. This notice of construction application will be submitted to the WDOH and EPA. The 327 Building has no notices of construction.

After the technical bases for the deactivation activities are prepared and specific activities identified, the activities will be evaluated for their potential to increase emissions to the atmosphere. Activities with the potential to increase emissions will then be compared against the Air Operating Permit and the notices of construction already available to determine if additional documentation is required. Any activity requiring a notice of construction also will require an updated Air Operating Permit.

The main 324 Building Stack (EP-324-01-S) is considered a major stack under the National Emission Standards for Hazardous Air Pollutants, and it is the only stack at the 324 Building with the potential to emit radionuclides. After deactivation, the building conditions and stack status will be evaluated to determine if the stack can be either removed from the list of WDOH registered stacks or redesignated as a minor stack.

The 327 Building has a major stack (EP-327-01-S) and a minor vent (EP-327-02-V) that are subject to the regulation under the National Emission Standards for Hazardous Air Pollutants (NESHAP). After deactivation, the building conditions and stack statuses will be evaluated to determine if the stack and vent can be removed from the list of WDOH registered stacks or redesignated as minor stacks.

9.4 Clean Water Act/Safe Drinking Water Act Status and Strategy

The Clean Water Act requires any source that discharges a pollutant into a surface water body to obtain and operate in compliance with a National Pollution Discharge Elimination System permit. The Clean Water Act includes radioactive materials in its definition of “pollutant” [33 U.S. Code 1362 (6)]. However, the EPA has interpreted “pollutant” to exclude radioactive materials regulated under the *Atomic Energy Act of 1954* (AEA). The Clean Water Act applies to naturally occurring and accelerator-produced radioisotopes; it does not apply to source, special, or byproduct materials as the AEA defines those terms.

Currently, four effluent streams originate from the 324 and 327 Buildings. None of these effluent streams are discharged directly to the environment. The streams are as follows:

- 300 Area process sewer system. The process sewer receives cooling water, process water, and other nonsanitary liquid waste that does not contain radioactive or dangerous materials exceeding regulatory limits. The process sewer line from the 324 and 327 Buildings ties into a header shared with other buildings, and water flows to the 300 Area Treated Effluent Disposal Facility, where it is treated before being discharged to the Columbia River. The Treated

Effluent Disposal Facility discharges effluent in compliance with the applicable National Pollutant Discharge Elimination System permit.

- 300 Area RPS system. The RPS receives wastewater normally free of radioactive contamination, but with the potential for such contamination. The liquids in the RPS are routed to a diverter station that automatically diverts the flow to the RLWS at the 324 or 327 Building if radioactive contamination is detected. Normally, the water flows to the 307 Basin where a redundant check for radioactivity is performed. If the water passes the check, it is discharged to the 300 Area process sewer system.

- 300 Area RLWS. The radioactive liquid waste in the 324 Building is collected in the LLV holding tanks inside the building. From there, it was historically transferred to the 300 Area RLWS. In the 327 Building, the radioactive liquid waste historically flowed directly to the RLWS. However, liquids generated in the 324 and 327 Buildings after FY 1998 will be collected in the 324/327 Buildings, managed, stored, and/or disposed of, as appropriate depending on the levels of contamination in the liquids.

- 300 Area sanitary sewer system. The sanitary sewer receives sanitary liquid waste from kitchens and rest rooms. The sanitary sewer lines from the 324 and 327 Buildings tie into a header in common with other 300 Area buildings, and the combined effluent flows to the City of Richland Publicly Owned Treatment Works.

During deactivation, the streams from the buildings will be eliminated, lines blanked, and drains plugged (Chapter 3.0, Sections 3.3.3.8 and 3.3.3.3).

9.5 NEPA/State Environmental Policy Act Status and Strategy

The NEPA is a review and documentation process, promulgated under 10 CFR 1021, *DOE NEPA Regulations*, and 40 CFR 1508.27, *CEQ - Regulations for Implementing NEPA*, and executed pursuant to DOE Order 5440.1E, *Implementation of the National Environmental Policy Act*, Chapter V. The documentation requires that all federal agencies identify the environmental impacts associated with the proposed actions that may significantly affect the environment. The NEPA requirements vary depending on the scope and size of the remedial action proposed.

The NEPA process includes the following potential steps (not all required for this project):

- Initial determination of the NEPA requirements for review and documentation
- Categorical exclusion
- Environmental assessment preparation
- Finding of no significant impact documentation
- Environmental impact statement preparation
- Public participation
- Record of decision.

Several documents address NEPA coverage of activities at the 324 and 327 Buildings, including Hanford sitewide and facility-specific categorical exclusions. The following environmental assessments are also applicable to the 324 and 327 Buildings Deactivation Projects:

- Environmental Assessment: Management of Hanford Site Non-Defense Production Reactor Spent Nuclear Fuel, Hanford Site, Richland, Washington, U.S. Department of Energy, Richland, Washington (March 1997)

- Environmental Assessment: Return of Isotope Capsules to the Waste Encapsulation and Storage Facility, Hanford Site, Richland, Washington, U.S. Department of Energy, Richland, Washington (May 1994)

- Environmental Assessment: Relocation and Storage of Isotopic Heat Sources, Hanford Site, Richland, Washington, U.S. Department of Energy, Richland, Washington (June 1997).

In addition, a State Environmental Policy Act environmental checklist was prepared in conjunction with the 324 Building RCRA closure plan.

Appropriate NEPA and State Environmental Policy Act reviews will be conducted before commencement of activities in accordance with applicable regulations. Once the deactivation tasks have been evaluated, defined, and selected, they will be screened to identify which tasks fall under existing NEPA documentation and any additional documentation that may be required. The screening forms and conclusions reached will be sent to DOE for their concurrence. Additional documentation will be prepared as required in accordance with the regulations. State Environmental Policy Act documentation will be provided in accordance with the regulations.

9.6 National Historic Preservation Act Status and Strategy

The National Historic Preservation Act provisions found in 36 CFR 800, *Determination of Eligibility for Inclusion in National Register*, require federal agencies to survey all lands and structures under their control, and evaluate all properties for eligibility to be listed in the National Register of Historic Places. However, a 1996 agreement between the State Historic Preservation Office, RL, and the National Advisory Council on Historic Preservation has replaced the normal provisions of the National Historic Preservation Act at Hanford. The 1996 agreement is designated the *Programmatic Agreement Among DOE-RL & WSHPO & Council for Maintenance & Deactivation & Alteration & Demolition of Built Environment on Hanford Site* (DOE/RL-96-77). The agreement requires that certain types of historic documentation be completed and filed for designated Hanford Site properties. The documentation can be a historic property inventory form (HPIF), an expanded HPIF (ExHPIF), or a historic American engineering record.

The agreement specifies that the 324 Building does not require any historic documentation. However, it also specifies that an ExHPIF will be required for the 327 Building before September 30,

2000. Historic documentation can be required sooner if the building configuration is changed, walls or other structural members are removed, or major equipment is taken out. During deactivation, the building configuration will not be altered, and walls will not be removed. However, some major equipment may be relocated or removed.

A walk-through of the 327 Building in December 1998 resulted in the identification of historic artifacts in the building (i.e., F-Cell control panel and manipulator). Additional walk-throughs may identify additional artifacts. If artifacts are not contaminated or if they can be decontaminated, they will eventually need to be removed and placed in storage suitable for historic artifacts.

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10.0 INTEGRATED SAFETY STRATEGY

Chapter 10.0 identifies the process that will be used by the 324 and 327 Buildings Deactivation Projects to ensure that the safety of personnel, the public, and the environment are adequately addressed during transition activities. The primary activity involved in this process is the implementation of the ISMS. The ISMS has as an overall goal of a continuous improvement cycle for safety in the work process. The cycle will be enhanced by requiring personnel feedback and increasing personnel awareness of all hazards. Primary activities to be implemented include the following:

- Screening or evaluating work activities to identify hazards and determine risk and complexity
- Identifying, controlling, or mitigating the hazards related to personnel, public, and environmental safety during deactivation activities
- Performing the work and providing a mechanism to encourage personnel feedback
- Using the DOE-approved authorization basis and unreviewed safety question process to determine if transition activities are within the defined safety envelope and, if not, to obtain the appropriate authorization
- Providing the required safety documentation for the S&M period.

10.1 Implementation of ISMS

Implementation of the ISMS, as described in HNF-MP-003, *Integrated Environment, Safety and Health Management System Plan* for the PHMC contractors, and in response to Defense Nuclear Facilities Safety Board Recommendation 95-2, is in progress. The implementation will institutionalize an integrated safety strategy across the PHMC contractors, and formalize a process already being utilized by the 324 and 327 Buildings. A gap analysis and implementation plan for ISMS implementation at 324 and 327 Buildings was completed in FY 1998. The implementation plan follows a graded approach to ensure the implementation considers building life cycle and cost effectiveness. Full implementation of the ISMS is in progress, with DOE verification scheduled for FY 2000.

10.1.1 ISMS Philosophy

The ISMS establishes a single, defined safety management system that integrates Environment, Safety and Health (ES&H) requirements into the work planning and execution processes to effectively protect the personnel, the public, and the environment. The ISMS, as shown in Figure 10-1, provides a mechanism for increasing personnel involvement in work planning (including hazard and environmental impact identification, analysis, and control), work execution, and feedback/improvement processes.

Effective implementation of the ISMS incorporates "best management practices" and supports the accomplishment of other building safety improvement initiatives.

The ISMS process supports ES&H integration into management and work practices at all work planning levels on the Hanford Site. The ISMS integrates the identification, analysis, and control of hazards and environmental impacts and provides feedback for continuous improvement in work definition, planning, and safe performance of work. The ISMS is a safety and work planning management system that incorporates five core ISMS functions, with the five environmental management system principles, into seven ISMS core functions as the basis for the Hanford Site ISMS. The seven core functions, stated below, collectively integrate safety and environmental management at the Hanford Site:

- Implement ES&H policy
- Define scope of work
- Identify ES&H hazards and requirements
- Analyze ES&H hazards and implement controls
- Perform work within controls
- Feedback and improvement
- Management review.

The ISMS core functions are implemented at the Hanford Site and are applied as a continuous ES&H management cycle. PHMC-, facility-, and activity-specific work activities, and the associated hazards and environmental impacts are addressed as appropriate, to ensure hazards and impacts are minimized.

10.1.2 ISMS Guiding Principles

Eleven guiding principles are used in the ISMS implementation:

- **Line Management Responsibility for Safety**. Line management is responsible for the protection of the public, the workers, and the environment.

- **Clear Roles and Responsibilities**. Clear and unambiguous lines of authority and responsibility for ensuring safety are established and maintained at all organizational levels within the 324/327 Buildings Deactivation Projects. This is achieved through the safety professionals, the Zero Accident Council and through visible management support for the safety program. Personnel are actively involved in work package and job development.

- **Competence Commensurate with Responsibilities**. Personnel possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities. All personnel supporting the stabilization of the 324 and 327 Buildings have been evaluated to ensure they meet the training and qualification requirements. Continuing training programs are in place to ensure a highly qualified workforce is maintained.

- **Balanced Priorities**. Resources are effectively allocated to address safety, programmatic, and operational considerations. Protecting personnel, the public, and the environment, is a priority whenever activities are planned and performed.

- **Identification of Safety Standards and Requirements**. Before work is performed, the associated hazards are evaluated, and an agreed-upon set of safety standards and requirements are established. If properly implemented, these standards and requirements provide adequate assurance that personnel, the public, and the environment are protected from adverse consequences. Building-specific S/RIDs have been developed for both 324 and 327 Buildings. The Phase 1 assessment of the S/RIDs has been completed. The Phase 2 assessment of the S/RIDs is ongoing, as part of the three-year management assessment process.

- **Hazard Controls Tailored to Work Being Performed**. Administrative and engineering controls to prevent and mitigate hazards are tailored to the work and associated hazards being performed. The use of engineering controls is encouraged through the ALARA (**a**s **l**ow **a**s **r**easonably **a**chievable) process. Lessons learned from other facilities, both on and off the Hanford Site, are incorporated in work plans.

- **Operations Authorization**. The conditions and requirements to be satisfied for operations to be initiated and conducted are clearly established and agreed upon. The buildings' authorization bases have been revised and submitted to RL for approval. Pre-job briefings are routinely conducted prior to authorizing work in the field.

- **Personnel Involvement**. Personnel are actively involved in preparing for work, including planning, hazard and environmental impact identification and analysis, implementation of controls, and readiness review. A team approach to work planning is encouraged by line management. All personnel are aware of their right to stop unsafe work without fear of reprisal.

- **Communication and Stakeholder Involvement**. Open and effective internal and external communication supports management of ES&H issues and initiatives. Management actively supports open communication with outside groups.

- **Continuous Improvement**. Personnel, including management, continually check the adequacy of the work processes, procedures, and equipment, and correct deficiencies when identified. Post-job briefings are held to capture lessons learned. The lessons learned are evaluated and incorporated into work processes as appropriate. In addition, a Radiological Control Improvement Plan has been issued and is being actively worked to address a Defense Nuclear Facilities Safety Board core issue on radiological control at the Hanford Site.

- **Senior Management Involvement**. Senior management is actively engaged in the implementation and improvement of the ISMS.

10.2 Personnel Safety

The core of the work planning process as related to personnel safety will be the computer-based Job Hazard Analysis technique (Figure 10-2). Use of the Automated Job Hazards Analysis (AJHA) tool has been implemented to obtain maximum benefit for near term significant work activities.

10.3 Safety Evaluation of Activities

The existing authorization bases for the 324 and 327 Buildings Deactivation Projects consists of:

- 324 Building
  - HNF-SD-SPJ-SAR-001, *Safety Analysis Report For 324 Building*
  - HNF-SD-SPJ-OSR-001, *324 Building Operating Limits*

- 327 Building
  - HNF-SD-SPJ-SAR-002, *327 Building Safety Analysis Report*
  - HNF-SD-SPJ-OSR-002, *327 Building Operating Limits.*

The documents were administratively updated to reflect PHMC high-level policy and procedures in September 1997. The origins of the authorization bases were to provide guidance documentation for PNNL during building operations, and with the changed mission from operating to deactivation, technical upgrade of the authorization bases has been completed. The RL approval of the upgrade of the authorization bases is projected for April 2000.

A multi-tiered, comprehensive (and required) unreviewed safety question evaluation process has been developed and implemented that will support the diverse deactivation and risk reduction activities (e.g., 324 Building B-Cell Cleanup Subproject). The process includes an overview of all work tasks and procedure changes triggering subsequent unreviewed safety question screening and evaluations of appropriate procedure changes, work evolutions, or building modifications. The process has been documented in HNF-IP-1264, *324/327 Facilities Stabilization Projects Administration Manual*, Section 2.7.

10.4 Transition and Post Transition Safety Documentation

An annual update of the authorization bases will be prepared, based on the rigorous unreviewed safety question process and progress with deactivation. The authorization bases upgrades and annual updates will address deactivation status and minimize efforts for the future unreviewed safety question determination.

As one of the conditions for transfer to the Hanford Surplus Facilities Program, the safety documentation will be updated to reflect the current building conditions and controls necessary to prevent or mitigate accident scenarios. Both buildings are expected to become categorized as

"radiological" buildings. Based on the categorization, the appropriate safety documentation for S&M will be provided. The documentation will be developed per the current DOE Orders, standards, and other guidance and requirements. The documentation will rely heavily on the current building and Hanford Site safety documentation, and will be specific to the buildings' endpoint activities and conditions.

Figure 10-1. ES&H Policy Management Review.

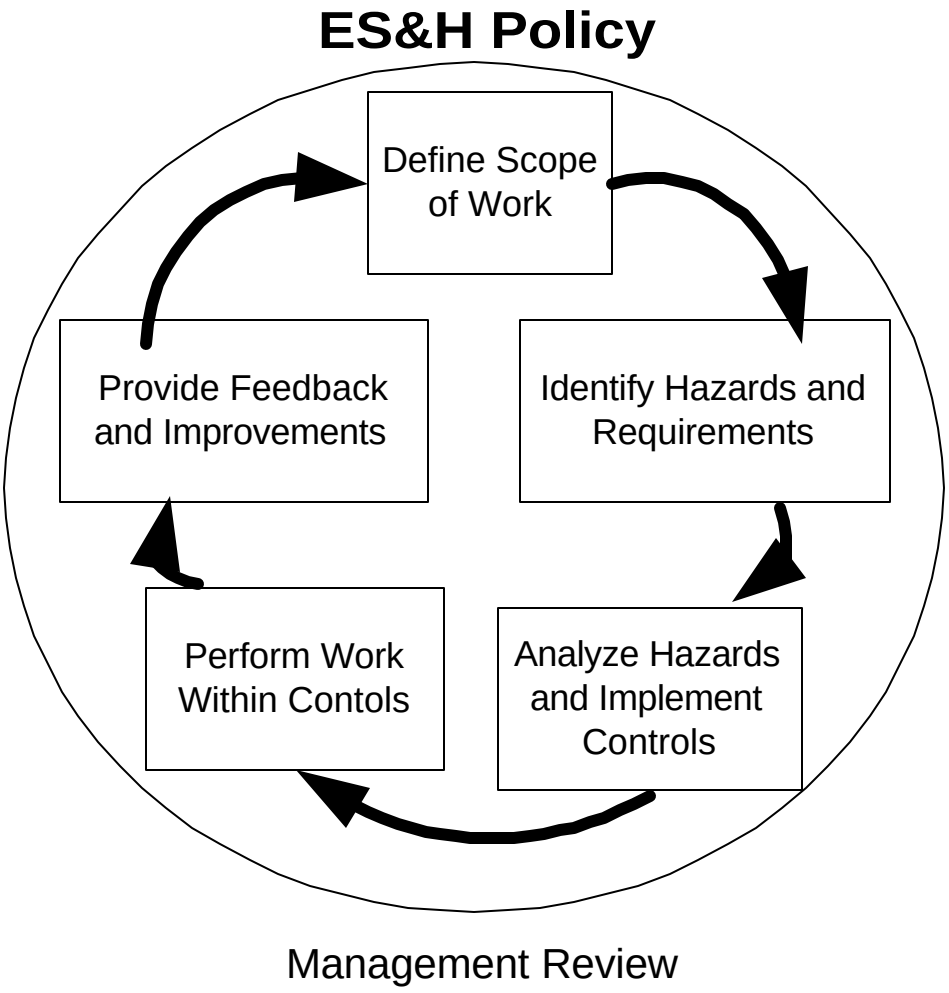
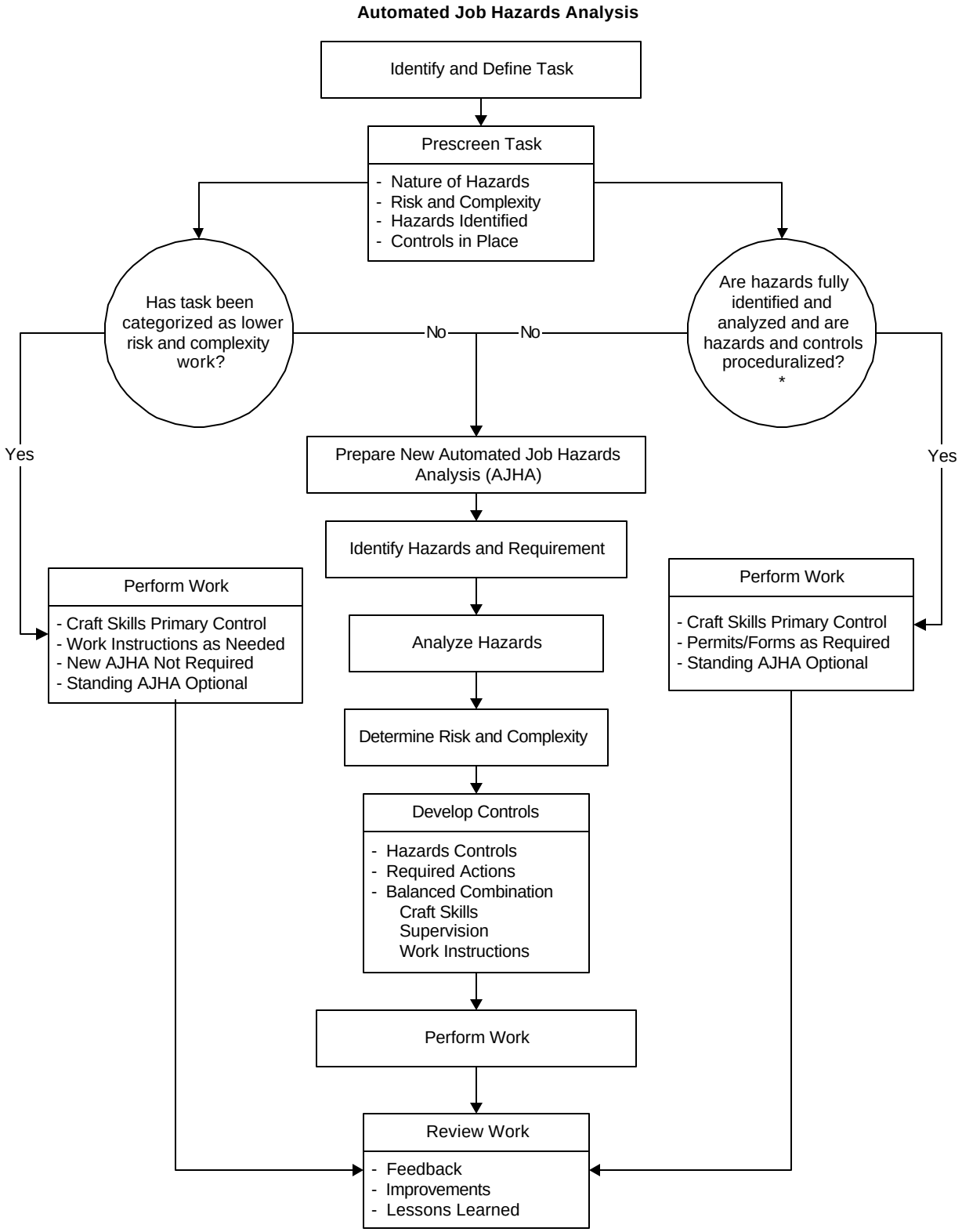


Figure 10-2. Automated Job Hazard Analysis Process.



* Procedure must be compliant with HNF-PRO-079, *Job Hazard Analysis*, which incorporates hazards and controls from a through hazard analysis process.

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11.0 COMMUNICATIONS AND PUBLIC INVOLVEMENT

The management team for the 324 and 327 Buildings Deactivation Projects is committed to open communications throughout the project. Effective communications and public involvement are critical to the success of the stabilization project. Communications must be active and dynamic in presenting accomplishments and responding to emerging issues and activities. Graded communication plans will be developed, as determined to be required by RL and FH to define specific actions for disseminating information regarding project objectives, strategies, concerns, and status, and for developing strategies for soliciting involvement. Communication will be targeted as required for all stakeholders.

Individuals, groups, organizations, and regulators who have an interest in the project, are affected by the project, or can affect the future of the project, are identified as "stakeholders." Major internal and external stakeholders include the 324/327 Buildings personnel, Native American Tribes, state and federal environmental regulatory agencies, the Washington State Historic Preservation Office, and the Defense Nuclear Facilities Safety Board. Other Hanford Site employees, customers, the media, the Hanford Advisory Board, and the public are also targeted as stakeholders.

11.1 Communication Objectives

The 324 and 327 Buildings Deactivation Projects have the following key communication objectives.

- Develop stakeholder understanding of the project and identify stakeholder values.
- Obtain input from, involve, and gain the acceptance of all interested parties in decisions concerning the project.
- Communicate successful activities, and share project issues and concerns with interested parties and the news media (as appropriate).

11.2 Communications Strategy

The River Corridor Project Vice President, the Project Directors of the 324 and 327 Buildings Deactivation Projects, appropriate project managers, and the Project Control Manager, in conjunction with RL, will work together to develop and implement communications strategies. Early and consistent involvement of interested parties helps decision-makers select solutions that can stand the test of time. Current decisions, upcoming decisions, or former decisions being challenged will be a key focus of involvement. Typically, interested groups and individuals want to be involved early in each step of the decision-making process. The project should anticipate issue areas and propagate direct communication efforts.

As recommended by the Hanford Advisory Board, the Project will apply the following strategies to involve customers, regulators, stakeholders, Native American tribes, and the public.

- Promote a common understanding of 324/327 Buildings' subprojects, the need for deactivation, the risk to the public and the environment, and the challenges involved.

- Make available the background information needed for interested parties to understand the risks, the problems to be solved, and decisions to be made to complete the stabilization. At the same time, efforts will be taken to identify the audiences who want to be involved in the project. This step is critical to ensure that the affected audiences buy into the need for deactivation.

- Identify subproject issues or decisions that are of special interest. Not all decisions are equal. Involvement must revolve around specific activities that affect various groups.

- Establish an issue resolution process for issues or decisions of interest. Actions or decisions that have a high level of interest or where potential tradeoffs exist between values will require additional interactions to resolve.

- Conduct issue-resolution processes, as necessary, to select the best decisions and keep audiences informed of progress in implementing these decisions.

The management team for the 324 and 327 Buildings Deactivation Projects will encourage news coverage and respond to media inquiries received from local, Northwest, and selected national broadcast and print media, especially the Washington, D.C. trade press. The coverage will accomplish the following.

- Emphasize the importance of accelerating deactivation of the Hanford Site's former production and processing plants to reduce risk and reduce the mortgage on facilities that are no longer needed.

- Correct inaccurate information, defuse potentially negative issues, and secure balanced media coverage.

- Broaden public understanding and support for the transition activities specifically, and for Hanford Site cleanup work generally.

11.3 Communications Methods, Channels, Formats, and Distribution

The approach to communications will be broad and comprehensive, creative and innovative, and results-oriented. Among approaches to be evaluated and used as appropriate, are the following:

- Distribution of informational materials as desired or required (e.g., fact sheets, NEPA decision-making documents) through well-established (and under-used) existing channels

- Provision of information at meetings and workshops as desired or required (e.g., Hanford Advisory Board, Tri-Party Agreement, or environmental public meetings)

- Provision of integrated informational materials (print, presentations, video, etc.) that present the whole picture rather than incremental pieces of the stabilization project to interested audiences

- Use of the internet.

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12.0 PROJECT RISK

Chapter 12.0 outlines a methodology that will be used to assess project risk qualitatively or subjectively. The approach is modeled after project risk assessment processes outlined in standard project management texts and training courses but tailored to the unique risks encountered in DOE projects.

In the context of this chapter, project risk means risk to one of the project baselines (technical, cost, or schedule) and should not be confused with health and safety risks. However, health and safety issues are considered to the extent that they affect the risk to the project baselines.

12.1 Risk Assessment Tools

The following two primary tools will be used to conduct risk assessments:

- The Risk Assessment Matrix (Table 12-1). The Risk Assessment Matrix consists of two elements: risk factors and risk ranking guidelines. The risk factors represent the topics considered to have the most influence on project risk. The risk ranking guidelines are qualitative statements assigned to a low-, medium-, and high-risk category. The risk ranking guidelines are used to determine the risk impact of each of the risk factors to the project baseline.

- The Risk Assessment Data Sheet (Figure 12-1). The Risk Assessment Data Sheet is the tool used to document the results of the risk assessment session, and is designed to be used in conjunction with the Risk Assessment Matrix to obtain a structured, consistent, and rigorous assessment of risk.

The two tools can be used to manage the project risks by identifying, assessing, and reducing the risks through mitigation and contingency planning.

12.2 Risk Assessment Process

The risk assessment tools (Risk Assessment Matrix and Risk Assessment Data Sheet) may be applied at the project level, the subproject level, or the task level, as appropriate.

Risk assessments typically will be performed by an assessment team made up of project managers, technical staff, operating and field staff members, customers (FH Senior Management, RL, DOE-HQ) and selected stakeholders as appropriate. The make-up of the team will vary, based on the project element and its position in the baseline hierarchy (i.e., project level, subproject level, or task/activity level). A team leader may be assigned or selected to schedule, lead, and document the results of the risk assessment session. The results of all project risk assessments will be maintained in project files. Assessments may be performed throughout the life of the project. Typically, risk

assessments will be performed to support the change request process, when baseline adjustments are necessary, or to support the decision process for selection and implementation of technical alternatives.

The principles of this risk assessment guidance were used throughout the PMP development phase by the project management team, enhanced with contractor technical support. The prescriptive assessment tool is to be used during the intensive risk reduction and deactivation activities, when dedicated project management technical support is not readily available.

12.3 Issue Resolution and Decision Making

This section provides guidelines for the resolution of significant technical and program issues encountered during the project involving risk assessments. A systematic issue resolution and decision making process provides an approach to resolving project issues that is visible to internal and external stakeholders and enhances the confidence that decisions will be upheld.

Issue resolution and decision making will occur at all levels of the project organization, at all times, and with varying impact to the project. Many technical issues are resolved at the work planning level and usually have low impact to the project direction. Other major technical or program issues require resolution at a higher organizational level (project management and above) because of their potential for significant project impact. The issue resolution and decision-making process outlined in subsequent sections is intended to address the project decisions that significantly affect the project.

12.3.1 Issue Resolution Process

The issue resolution and decision-making process is summarized in Figure 12-1. The process begins when an issue is raised for resolution within a subproject. The project manager or designated staff identifies a set of alternative solutions. If several likely alternatives exist, the alternatives are systematically evaluated against a set of discriminating criteria (Section 12.3.2) used to identify a preferred alternative. This evaluation is documented in an appropriate format before the results are presented to the project management team.

If the recommended course of action could cause a major impact to project scope, schedule, or estimate, the Project Director and appropriate DOE counterparts will review the results of the evaluation and either confirm or reject the recommended course of action. If the recommendation is rejected, additional analysis will be performed with the results presented back to the Project Director and his DOE project counterparts. If the recommendation is accepted, it is finalized, documented, communicated, and implemented.

12.3.2 Decision Criteria

The following nine performance measures have been identified that can be used to evaluate alternatives in support of the issue resolution and decision-making process:

- Schedule
- Cost
- Operability
- Maintainability
- Safety
- Environmental
- Technical maturity
- Complexity of interfaces
- Risk.

The project values and objectives need to be considered while evaluating alternatives, but do not necessarily directly relate to technical evaluation of the alternatives. The recommended alternative should support the various values and objectives.

The performance measures represent a mixture of quantitative and qualitative factors. Some of the performance measures, such as cost, directly represent measurable variables that qualitative factors influence because some assumptions are used to develop the costs. Other performance measures, such as operability, depend much more on the experience and values of evaluators. Although some decision makers tend to focus on tangible and immediately visible performance measures, such as cost and schedule, some of the less tangible performance measures, such as operability and safety, can carry heavy hidden cost penalties. These hidden costs should be identified by means of sensitivity analyses. The performance measures are as follows:

- **Schedule**. Implementing schedules and associated schedule risk will be assessed relative to implementation of a given alternative. Schedule interface with Tri-Party Agreement and other internal (FH) or external (DOE, regulatory, stakeholder) schedule requirements will be considered.

- **Cost**. The equipment, system or component will be evaluated with respect to capital, operating (including waste handling, analytical, and preparatory paperwork), and life-cycle costs.

- **Operability**. This criterion is used for equipment and systems to be used during deactivation or installed for long-term S&M (i.e., emergency lighting). Operability of a system is mostly a qualitative measure of the inherent complexity of a system that influences other aspects of operability, such as the following:
  - Startup and shutdown of the system
  - Process control
  - Troubleshooting and response to off-normal conditions
  - Operator interface.

- **Maintainability**. This criterion is used for equipment and systems to be used during deactivation or installed for long-term S&M (i.e., emergency lighting). Evaluating the

complexity, reliability, and repair-ability can determine the maintainability of a system of the associated equipment and components.

- **Safety**. Alternatives should be compared on the bases of associated hazards and implications for onsite and offsite safety, worker safety, and property protection.

- **Environmental**. The environmental (regulatory) impacts of a system can be assessed by evaluating the following factors: liquid effluent generation, gaseous effluent generation, secondary dangerous waste generation, and permitting requirements.

- **Technical Maturity**. The technical maturity of a deactivated process, system, or piece of equipment can be assessed by direct application or demonstration in the DOE complex or nuclear industry. Other factors that influence technical maturity or technology assurance include maximizing adaptability for new technologies or mission change, design flexibility or adaptability for incorporating improved technology, and avoiding regulatory uncertainty.

- **Complexity of Interfaces**. The complexity of building and functional interfaces is assessed by evaluating compatibility with existing systems and complexity introduced by needed changes, requirements for support functions and facilities, and the number and diversity of organizations that must be involved in implementation.

- **Risk**. The risk associated with a particular alternative can be examined by its sensitivity to cost and schedule changes and the capability of the alternative to uphold project values.

Table 12-1. Risk Assessment Matrix.

RISK FACTOR	QUALITATIVE RISK RANKING GUIDELINES		
	LOW	MEDIUM	HIGH
TECHNOLOGY	- Conventional/off-the-shelf - Extensive previous building application - Little or no testing required	- Proven state of the art - Some previous building or site application - Some proof of application testing required	- Unproven/new - Little or no previous building or site application. - Extensive proof of principle testing required. - Complex/highly engineered
INTERFACES	- Little or no impact from other site programs, operations or contractors - Established and mature interfaces and working relationships used	- Potential impact from other site operations, programs or contractors - Some new interfaces must be established and managed	- Potential MAJOR impact from other site operations, or contractors - Multiple and/or complex interfaces required which may include competing objectives
SAFETY	- Small project (fewer than 50 FTE) - Little or no construction - Contractor experienced on same type of project - Worker health and safety "integrated" with job planning. Integrated approach is fully implemented and mature - Building/contractor has exemplary safety record	- Moderate sized projects (50-150 FTE) - Most elements of an "integrated" worker health and safety approach exist but may not be fully mature - Contractor/building has excellent safety record - Existing hazards are well understood	- Large projects (more than 150 FTE) - Multiple hazards - some of which are not well understood or there is a lack of experience in dealing with - Significant construction required - Contractor/building does not have strong safety record or a mature safety program - "Integrated" worker health and safety approach not implemented

Table 12-1. Risk Assessment Matrix continued.

RISK FACTOR	QUALITATIVE RISK RANKING GUIDELINES		
	LOW	MEDIUM	HIGH
POLITICAL VISIBILITY AND STAKEHOLDER INVOLVEMENT	- Little or no stakeholder interest	- Some information sharing and communication outreach required - Stakeholders neutral but interested in progress updates	- Potentially sensitive to stakeholders - Independent oversight or significant outreach/input required - Involvement/coordination with multiple regulatory agencies
FUNDING	- Less than one year duration - Detailed and validated estimate exists	- Two to three year duration - Detailed estimate but not yet validated	- Three or more years duration - Conceptual level estimate
TIME/SCHEDULE	- No known schedule constraints - Predecessor and successor actions are simple and clearly identified and understood. - Demonstrated ability to perform activities - No assumptions with regard to performance - Resources identified, committed and under building control	- Some schedule constraints exist by won't affect completion date - Assumptions have been validated - Some resources required outside of building but high confidence in availability based on past performance	- Multiple schedule constraints/compressed schedule - Activities developed only to conceptual level (multiple invalidated assumptions) - Resources uncommitted or not identified
SITE CHARACTERISTICS	- 1 site or building - DOE property - Accessible - No required infrastructure	- 2-3 sites or facilities - Government property - Accessible - Minor infrastructure	- 4 or more sites or facilities - Private property - Restricted Access - Major Infrastructure
LABOR	- Low to moderate skill - Readily available - Gradual buildup - Low productivity requirement	- Moderate/high skill - Restricted availability - Phased buildup - Moderate productivity required	- Moderate/high skill - -Severely restricted availability - Rapid build-up - High Productivity required

Table 12-1. Risk Assessment Matrix continued.

RISK FACTOR	QUALITATIVE RISK RANKING GUIDELINES		
	LOW	MEDIUM	HIGH
QUALITY REQUIREMENTS	- Large tolerances - Low QC requirements	- Average QC requirements	- High QC requirements
NUMBER OF KEY PARTICIPANTS (Internal and external)	- 1	- 2-3	- 3 or more
CONTRACTOR CAPABILITIES	- Proven track record and resources immediately available	- Limited experience or resource availability	- Newly acquired capabilities or resources committed to other projects
REGULATORY INVOLVEMENT	- Minimal permit requirements (e.g. NEPA CX) - No compliance issues	- Routine permit requirements with multiple agencies (e.g., NEPA EA) - Compliance issues have precedent or defined path forward. Little negotiation required.	- Complex permit requirements with multiple agencies or branches of government (e.g., NEPA EIS) - Precedent setting compliance paths requires. Significant negotiation.
MAGNITUDE AND COMPLEXITY OF CONTAMINATION	- No potential for chronic or acute exposure to chemical or radiological hazards. - High confidence in the characterization of industrial, chemical and radiological hazards. - Exemplary ALARA/HAZCOM/RadCon and Industrial safety program performance record.	- Potential for chronic or acute exposure to well defined chemical or radiological hazards - Excellent ALARA/HAZCOM/RadCon and Industrial safety program performance record	- Potential for overexposure to chemical or radiological hazards - Industrial, chemical and radiological hazards not well characterized/defined - Less than excellent ALARA/HAZCOM/RadCon and Industrial Safety program performance record

Figure 12-1. Risk Assessment Data Sheet

RISK ASSESSMENT AREA (Cost, Schedule, Scope, Etc.)			
RISK FACTOR	RISK RANK	RISK CONTRIBUTORS	MITIGATION & CONTINGENCIES
Technology			
Interfaces			
Safety			
Political Visibility & Stakeholder			
Funding			
Time/Schedule			
Site Characteristics			
Labor			
Quality Requirements			
Number of Key Participants			
Contractor Capabilities			
Regulatory Involvement			
Magnitude and Complexity of Contamination			

13.0 References

The following federal and state laws, federal and state regulations, and PHMC documents were referenced throughout this PMP.

13.1 Laws and Regulations

Atomic Energy Act of 1954

Clean Air Act of 1955

Clean Water Act of 1977

Hanford Federal Facility Agreement and Consent Order

National Environmental Policy Act of 1969

National Historic Preservation Act of 1966

Resource Conservation and Recovery Act of 1976

Safe Drinking Water Act of 1974

WAC 173-303, "Dangerous Waste Regulations"

WAC 197-11, "State Environmental Policy Act"

10 CFR 830.120, *Quality Assurance Requirements*

10 CFR 1021, *DOE NEPA Regulations*

36 CFR 800, *Determination of Eligibility for Inclusion in National Register*

40 CFR 1508.27, *CEQ-Regulations for Implementing NEPA*

13.2 Other Documents

BWHC-9957236, *B-Cell Crane Long-Range Improvement Plan*, Letter, A. Clark, B&W Hanford Company, to L. J. Olguin, Fluor Daniel Hanford, Inc., September 29, 1999.

Defense Nuclear Facilities Safety Board Recommendation 95-2, *Safety Management*, October 1995.

DOE/EM-0318, *Facility Deactivation Guide—Methods and Practices Handbook - Emphasizing End Points Implementation*.

DOE Order 4700.1, *Project Management System*, 1992.

DOE Order 5440.1E, *Implementation of the National Environmental Policy Act.*

DOE/RL-96-73, *324 Building Radiochemical Engineering Cells, High-Level Vault, Low-Level Vault, and Associated Areas Closure Plan*.

DOE/RL-96-77, *Programmatic Agreement Among DOE-RL & WSHPO & Council for Maintenance & Deactivation & Alteration & Demolition of Built Environment on Hanford Site*, August 1996.

DOE-STD-1027, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.*

HNF-1730, Rev. 2, *324/327 Buildings Special-Case Waste Assessment and Disposition Alternatives Analysis*, September 1999.

HNF-1867, Rev. 0, *Assessment of Alternative Management Operations for 300 Area Light Water Reactor Spent Nuclear Fuel*.

HNF-2118, Rev. 0, *327 Building Endpoints*, February 1998.

HNF-2119, Rev. 0, *324 Building Endpoints*, February 1998.

HNF-2804, Rev. 2, *B-Cell Waste Classification Sampling and Analysis Plan*.

HNF-4799, Rev. 0, *Revised Methodology for Determining Cesium-137 Content of HN-200 Grout Containers*.

HNF-4842, Rev. 0, *324 Building B-Cell Characterization: Assay of Maximum Dispersible Radioactivity.*

HNF-4904, Rev. 0, *Data Analysis and Radionuclide Scaling Factor for the B-Cell Waste Stream*.

HNF-4905, Rev. 0, *Revised Methodology for Estimated the Radionuclide Profile of HN-200 Grout Containers*.

HNF-5064, Rev. 0, *Radiochemical Engineering Cells Decontamination Engineering Trade Study*.

HNF-5065, Rev. 0, *B-Cell Dispersible Material Removal Engineering Trade Study*.

HNF-IP-1264, *324/327 Facilities Stabilization Projects Administrative Manual*.

HNF-MP-001, *Management and Integration Plan*, May 1999.

HNF-MP-003, *Integrated Environment, Safety and Health Management System Plan*.

HNF-MP-599, *Project Hanford Quality Assurance Program Description.*

HNF-PRO-079, *Job Hazard Analysis.*

HNF-PRO-246, *Management Assessment.*

HNF-PRO-259, *Graded Quality Assurance*.

HNF-PRO-261, *Quality Assurance Program Plans*.

HNF-PRO-518, *Work Breakdown Structure, Index and Dictionary*.

HNF-PRO-519, *Schedule Development.*

HNF-PRO-533, *Change Control.*

HNF-PRO-585, *Cost Estimating*.

HNF-SD-SPJ-OSR-001, *324 Building Operating Limits.*

HNF-SD-SPJ-OSR-002, *327 Building Operating Limits.*

HNF-SD-SPJ-SAR-001, *Safety Analysis Report For 324 Building.*

HNF-SD-SPJ-SAR-002, *327 Building Safety Analysis Report.*

HNF-SP-1228, Rev. 1, *Quality Assurance Program Implementation Plan*.

324 Building Decontamination Sequencing and Details (in draft form).

324 Building Liquid Waste Handling Options Modifications Project Plan.

324 Building Physical and Radiological Characterization Study (in draft form).

324 High-Level Vault and Low-Level Vault Engineering Study (in draft form).

327 Building Liquid Waste Handling Options Modifications Project Plan.

Calculation Notes for High-Level Vault Non-Destructive Assay (in draft form).

Environmental Assessment: *Management of Hanford Site Non-Defense Production Reactor Spent Nuclear Fuel*, Hanford Site, Richland, Washington, U.S. Department of Energy, Richland, Washington, (March 1997)

Environmental Assessment*: Return of Isotope Capsules to the Waste Encapsulation and Storage Facility*, Hanford Site, Richland, Washington, U.S. Department of Energy, Richland, Washington, (May 1994)

Environmental Assessment: *Relocation and Storage of Isotopic Heat Sources*, Hanford Site, Richland, Washington, U.S. Department of Energy, Richland, Washington, (June 1997).

Project Hanford Activity Based Cost Estimating (ABC) Preparation Template, December 21, 1995.

Radionuclide Inventory in Tanks 113 and 115, prepared by Fluor Daniel Northwest, Inc., November 1998.

Summary of Agreements Reached during the Data Quality Objectives Process: 324 Building, documented in the administrative record of DOE/RL-96-73.