

**Implementation Plan  
for  
Defense Nuclear Facilities  
Safety Board  
Recommendation 92-4**

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## EXECUTIVE SUMMARY

Hanford Site radioactive waste from defense production is stored in 177 underground tanks. Most of these tanks are over 40 years old and are deteriorating. Consequently, their condition has raised potentially serious public health and safety concerns. These concerns include leakage of radioactive waste (67 tanks), periodic release of flammable gases (24 tanks), development of potentially unstable organic and ferrocyanide compounds (9 and 20 tanks, respectively), release of potentially toxic vapors (up to 70 tanks), nuclear criticality concerns (up to 10 tanks), and excessive heat generation (1 tank). These tanks and other Hanford facilities created to support the defense production mission need to be cleaned up in a systematic manner.

In December 1991, the Department of Energy (DOE) initiated the Tank Waste Remediation System Program (TWRS) to resolve the waste tank safety issues and remediate the tank waste. As part of TWRS, a new project was started to design a Multi-Function Waste Tank Facility (MWTF). MWTF was conceived to be six new tanks for diluting and storing waste removed from old tanks that have priority safety issues.

During 1992, the Defense Nuclear Facilities Safety Board (DNFSB) initiated its reviews of the MWTF project. The MWTF was completing conceptual design at the time. As a result of the review, the DNFSB submitted Recommendation 92-4 to the Secretary of Energy on July 6, 1992.

The Defense Nuclear Facilities Safety Board -- hereafter referred to as "the Board" -- in Recommendation 92-4 recommended that DOE do two things, first the DOE should establish a plan and methodology that results in a project management organization for the MWTF project team that assures that both DOE and the contractor organization have personnel of the technical and managerial competence to ensure effective project execution. And secondly the Department should identify the design bases and engineering principles and approaches for the MWTF Project that provide the data and rationale to show that the design for the MWTF conservatively meets the quantitative safety goals described in the Department's Nuclear Safety Policy (SEN-35-91).

DOE accepted the Board's recommendations on August 28, 1992 and proposed an implementation plan on February 4, 1993. This plan recognized that solving the MWTF issues raised by the Board requires an integrated approach to the Hanford Mission. Therefore, this plan considers MWTF within the context of the TWRS program. In the Board's response of April 23, 1993 to the proposed plan, the Board strongly endorsed DOE's efforts both to plan MWTF activities within the context of TWRS and to extend the principles outlined in the recommendation to the overall TWRS program. However, the Board rejected the proposed plan since it did not definitively address specific actions to be taken by DOE and Westinghouse Hanford Company (WHC). The Board also identified other weaknesses that are corrected in this Plan.

Having reviewed the situation at Hanford in light of the Board's recommendations and comments, DOE concludes that the MWTF problems that led to the recommendations are symptomatic of a more general and fundamental problem

at Hanford -- the lack of an integrated systems approach to defining, planning, controlling, and executing the Hanford mission. Therefore, DOE has reconsidered its overall approach to cleaning up Hanford by interpreting the Board's recommendations on a broader scale. The emphasis in this plan, however, initially will be directed to the TWRS program. This Plan describes the activities that DOE and WHC, the Hanford Management and Operations (M&O) Contractor, will carry out. DOE, as the owner, sets policy, establishes high-level requirements, and approves WHC-proposed actions to implement these requirements. The initiatives in the implementation plan are organized into five areas:

- Introduction
- Systems Engineering
- Program Management
- Reporting Requirements
- Change Control

The majority of the initiatives are contained in two sections, Systems Engineering and Program Management.

The Program Management section discusses how WHC will develop a clearly organized program management structure with technically qualified and competent people who have the proper program management tools to plan, organize, direct, control, and measure performance, as well as the necessary experience to systematically carry out the clean-up mission at Hanford.

The Systems Engineering section discusses the initiatives that will be developed and applied to provide a disciplined systems engineering methodology on TWRS to ensure that the overall design requirements and decisions; research and development; and construction, testing, operations, and termination (decommissioning) efforts are considered in an integrated fashion. The methodology will be applied to MWTF and other projects, not only because of the factors inherent to MWTF, but also because of interactions with other activities at the Hanford Site.

To implement the Board's recommendations, DOE has recently initiated a site-wide systems engineering approach for the definition and achievement of objectives at Hanford. DOE has also streamlined management to improve efficiency and provide a clear line of responsibility and accountability. This plan describes how these efforts will achieve the purpose of the Board's recommendations and also gives definitive milestones that the Board can use to measure DOE progress.

Pursuant to PL 100-456 (National Defense Authorization Act, Fiscal Year 1989), this plan is DOE response for implementing Recommendation 92-4. This plan has been developed to ensure it meets the requirements of the DNFSB's Policy Statement 1 (PS-1) regarding adequacy of DOE Implementation Plans for DNFSB Recommendations.

## 92-4 IMPLEMENTATION PLAN

### 1.0 INTRODUCTION

Hanford Site radioactive waste from defense production is stored in 177 underground tanks. Most of these tanks are over 40 years old and are deteriorating. Consequently, their condition has raised potentially serious public health and safety concerns. These concerns include leakage of radioactive waste (67 tanks), periodic release of flammable gases (24 tanks), development of potentially unstable organic and ferrocyanide compounds (9 and 20 tanks, respectively), release of potentially toxic vapors (up to 70 tanks), nuclear criticality concerns (up to 10 tanks), and excessive heat generation (1 tank). These tanks and other Hanford facilities created to support the defense production mission need to be cleaned up in a systematic manner.

#### 1.1 Recommendation of the Board.

The Defense Nuclear Facilities Safety Board -- hereafter referred to as "the Board" -- in Recommendation 92-4 recommended that DOE:

1. Establish a plan and methodology that results in a project management organization for the MWTF project team that assures that both DOE and the contractor organization have personnel of the technical and managerial competence to ensure effective project execution. This should emphasize management aspects of the project necessary to ensure adequate protection of public health and safety and should include the integration of professional engineering and quality assurance as necessary into the project, the application of appropriate standards and approved Department of Energy requirements, and the establishment of clear lines of responsibility and accountability.
2. Identify the design bases and engineering principles and approaches for the MWTF Project that provide the data and rationale to show that the design for the MWTF conservatively meets the quantitative safety goals described in the Department's Nuclear Safety Policy (SEN-35-91). The Board believes that this would include items related to standards, identification of safety related items, detailed design bases, functional design criteria, and safety analyses.

#### 1.2 DOE Response to the DNFSB 92-4 Recommendation.

DOE accepted the Board's recommendations on August 28, 1992 and proposed an implementation plan on February 4, 1993. This plan recognized that solving the MWTF issues raised by the Board requires an integrated approach to the Hanford Mission. Therefore, this plan considers MWTF within the context of the TWRS program. In the Board's response of April 23, 1993 to the proposed plan, the Board strongly endorsed DOE's efforts both to plan MWTF activities within the context of TWRS and to extend the principles outlined in the recommendation to the overall TWRS program. However, the Board rejected the proposed plan since it did not definitively address specific actions to be taken by DOE and WHC. The Board also identified other weaknesses that are corrected in this Plan.

Having reviewed the situation at Hanford in light of the Board's recommendations and comments, DOE concludes that the MWTF problems that led to the recommendations are symptomatic of a more general and fundamental problem at Hanford -- the lack of an integrated systems approach to defining, planning, controlling, and executing the Hanford mission. Therefore, DOE has reconsidered its overall approach to cleaning up Hanford by interpreting the Board's recommendations on a broader scale. The emphasis in this plan, however, initially will be directed to the TWRS program. This Plan describes the activities that DOE and Westinghouse Hanford Company (WHC), the Hanford Management and Operations (M&O) Contractor, will carry out. DOE, as the owner, sets policy, establishes high-level requirements, and approves WHC-proposed actions to implement these requirements.

1. WHC will develop a clearly organized program management structure with technically qualified and competent people who have the proper program management tools to plan, organize, direct, control, and measure performance, as well as the necessary experience to systematically carry out the clean-up mission at Hanford.

2. WHC will develop and apply a disciplined systems engineering methodology on TWRS to ensure that the overall design requirements and decisions; research and development; and construction, testing, operations, and termination (decommissioning) efforts are considered in an integrated fashion. The methodology will be applied to MWTF and other projects, not only because of the factors inherent to MWTF, but also because of interactions with other activities at the Hanford Site.

To implement the Board's recommendations, DOE has recently initiated a site-wide systems engineering approach for the definition and achievement of objectives at Hanford. DOE has also streamlined management to improve efficiency and provide a clear line of responsibility and accountability. This plan describes how these efforts will achieve the purpose of the Board's recommendations and also gives definitive milestones that the Board can use to measure DOE progress.

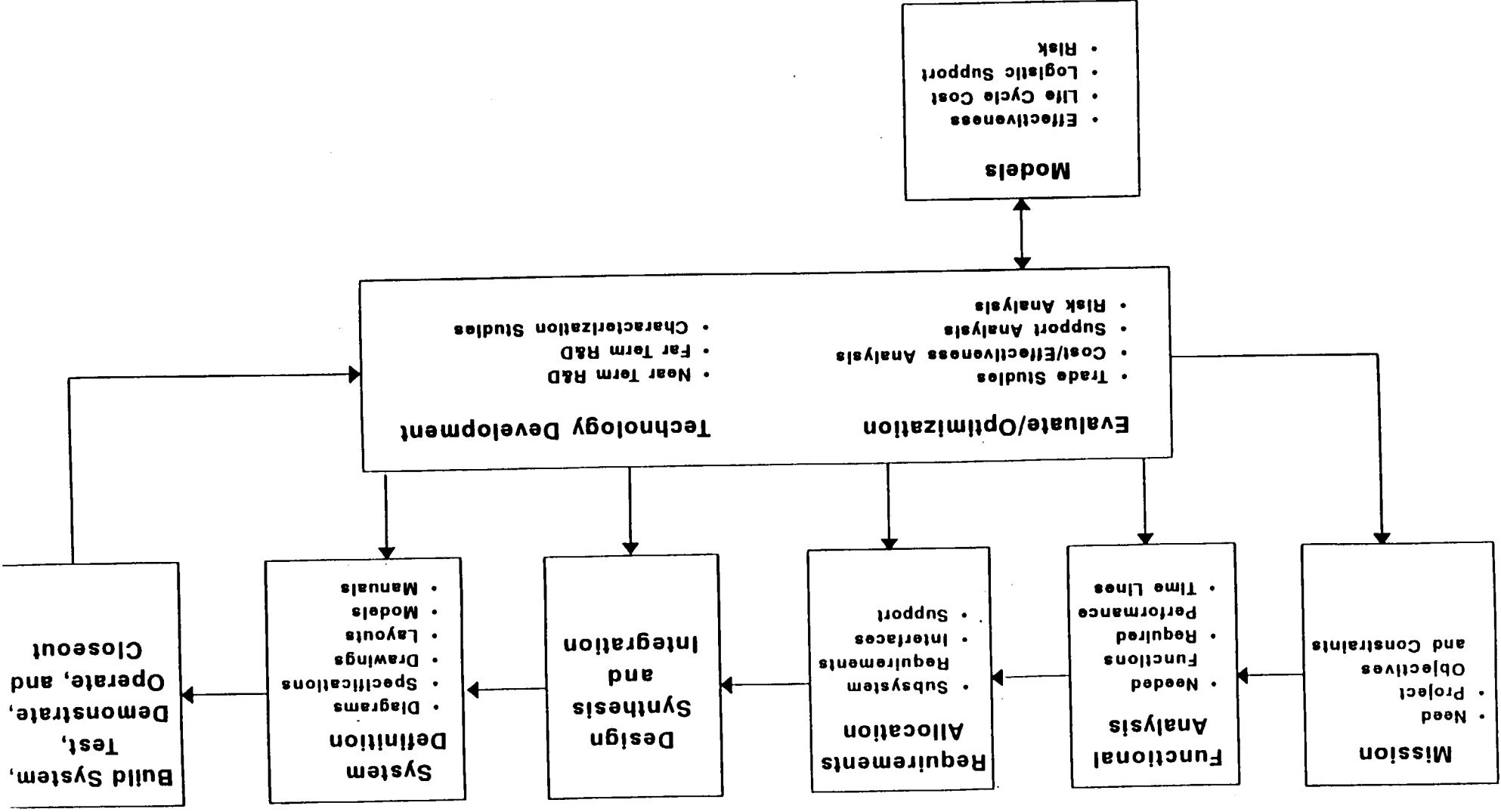
### 1.3 Organization of the Implementation Plan.

This Plan consists of two integrated efforts: a Program Management effort, which addresses the first recommendation, and a Systems Engineering effort, which addresses the second. This Plan will accommodate parallel site and program systems engineering. The need for timely integration of programs and projects, timely input for technical decision making, and the incorporation of regulatory constraints, management expectations and divergent values in programmatic decision making will be satisfied by implementing this Plan.

Figure 1 provides an overview of the systems engineering approach to implement 92-4 using a logic flow diagram. The broad application of the systems engineering approach DOE will be taking at Hanford will affect other Board recommendations (listed in Table 1) that impose requirements on the Hanford system. The systems approach will incorporate the requirements from these recommendations and their respective implementation plans.

Section 1 provides general background material. Section 2 addresses the systems engineering aspects of the Plan. It contains definitions used by DOE and its contractors and describes the current status and future implementation actions for the systems engineering work. It also identifies the commitments that DOE is making to the Board in this area. Section 3 addresses the program management aspects of 92-4, and likewise describes the current status and future implementing actions. It also identifies the commitments that DOE is making in the program management area. Section 4 provides reporting requirements associated with completing commitments of implementation of Recommendation 92-4. Section 5 provides a section describing the control of changes to this implementation plan. Attachment A is a glossary of terms used in the implementation plan and Attachment B is a matrix for ease of referring to commitments made in the implementation plan.

**FIGURE 1: 92-4 SYSTEMS ENGINEERING APPROACH OVERVIEW**





**TABLE 1: OTHER DNFSB RECOMMENDATIONS AFFECTED BY 92-4**

90-2	Codes and Standards: Identification, Adequacy, and Implementation
90-3 & 90-7	Hanford Tank Monitoring
91-1	Codes and Standards Utilization
91-6	Radiation Protection
92-2	Facility Representative Program
92-5	Discipline of Operations
92-6	Operational Readiness Review
92-7	Training and Qualifications
93-3	Improving the Technical Capability in Defense Nuclear Facility Programs
93-5	Tank Waste Characterization

## 2.0 SYSTEMS ENGINEERING

This section describes the systems engineering effort to implement Part 2 of the Board's Recommendation, and summarizes the various Hanford systems. Section 2.1 is an overview of the systems engineering implementation at TWRS. Sections 2.2 through 2.4 provide a discussion of the TWRS in terms of the overall Hanford system, the status of the TWRS program and projects, and the implementing actions to be undertaken as part of this plan.

### 2.1 Overview of the Systems Engineering Implementation.

Since the TWRS, and its supporting projects including MWTF, is one of Hanford's significant programs, the site systems engineering effort will first focus on defining the scope, functions, and requirements for the TWRS. An initial systems engineering analysis of the functional and top-level requirements for TWRS is complete (Commitment 2.1.a). These requirements will be applied with the project standdown reviews as discussed below. A second, more detailed TWRS top-level functions and requirements analysis will be completed by January 18, 1994 (See Section 2.3, Commitment 2.3.a). The TWRS top-level functions and requirements analysis will set the framework for the projects, ensuring that requirements will be identified and embedded into the project designs, including requirements for technology development needs, verification testing, and applicable safety requirements such as DOE Orders, DOE Nuclear Safety Policy SEN-35-91, and consensus codes and standards.

Major TWRS projects identified to date by the systems engineering analysis and recent Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) negotiations include:

- Multi-Function Waste Tank Facility (MWTF)
- Initial Pretreatment Module (IPM)
- Hanford Waste Vitrification Plant (HWVP)
- Low Level Vitrification System
- Cross Site Transfer System
- Aging Waste Transfer Line
- Tank 241-C-106 Sluicing
- Initial Tank Retrieval System (ITRS)

The TWRS systems engineering effort must quickly validate or modify the design bases of several projects that are currently in advanced stages of design. Therefore, standdown reviews will be performed on the following existing TWRS projects:

- MWTF
- IPM
- HWVP
- Cross Site Transfer System
- Aging Waste Transfer Line
- Tank 241-C-106 Sluicing
- ITRS

The standdown reviews are discussed further in Section 2.4, Commitment 2.4.a. The Low Level Vitrification System requirements will be defined by the systems engineering analysis.

With the recent completion of negotiations to the Tri-Party Agreement and in accordance with the proposed new directions contained therein, DOE with concurrence from the State of Washington, Department of Ecology (Ecology), directed WHC on October 25, 1993 to:

- Terminate all construction and procurement activities associated with the HWVP Canister Storage Building (CSB)
- Continue construction of the HWVP Office Building with related supporting site utilities.
- Ramp down the current HWVP design media to a condition sufficient (only) to maintain the capability to reactivate, staff up and initiate construction rapidly.

With this action taken, a standdown review will not be conducted at this time on the HWVP and CSB.

The standdown reviews are complete. Results from the TWRS functional and top-level requirements analysis will be used to identify the project needs, boundaries, interfaces, and design bases. Decisions to proceed, delay, or redefine the TWRS projects will be based on this information. A summary letter will be sent to the Board by January 13, 1994 discussing the results of these reviews, and identifying the schedules for terminating or revising current projects including MWTF. See Section 2.4, Commitment 2.4.b.

The TWRS system engineering effort will address the specific issues raised in the Board's recommendation and April letter regarding the requirements and technical program for the MWTF. This will include re-examining fundamental questions such as: (1) What are the primary functions of the tanks? (2) What are their fundamental design features? (3) How many and what size new tanks are needed? (4) When are they needed? DOE commits to provide definitive answers to these questions by February 18, 1994 (Commitment 2.1.b).

TRW, as part of an ongoing TWRS systems engineering support effort, has conducted an evaluation of the applicability of aerospace developed standards for system engineering (MIL-STD-499B) and technical reviews (MIL-STD-1521). The evaluation provides a correlation between what the military standards require and what is being met by existing DOE standards. This work is complete. A written report has been provided to WHC (Commitment 2.1.c).

The systems engineering effort for the remainder of the site systems will be performed in parallel with this TWRS work. WHC Systems Engineering will apply site-wide, top-down system analysis to identify, define, and integrate the site programs and projects. Requirements identification, allocation, and verification will be described and managed through Site and Program System Engineering Management Plans (SEMPs) and implementing procedures. The site,

program, and project systems engineering efforts will continue through their life cycles to verify and monitor performance against requirements and manage and control all interface relationships. Active interface control and monitoring will be a key element in program and configuration control and will be required by the SEMP.

MILSTDS, commercial codes and standards and other source documents are treated as requirements in the context of systems engineering. As such, they are identified and allocated to functions in greater detail as the systems engineering proceeds to lower levels of the systems. At the current level of the analysis these requirements are not discriminating factors in the definition of the system. As functions and architectures become more design specific, standards will be evaluated for applicability and invoked where appropriate.

The timing of these activities and the level where specific standards and codes or parts thereof that will appear in the analysis will vary according to the functions and implementing architectures. This work will be performed with the participation of cognizant representatives in the functional areas being analyzed.

The initial systems engineering analyses at the site-wide level will be completed by June 30, 1994 (Commitment 2.1.d). The results of this effort will be reported in the Functions and Requirements documentation and the Technical Baseline Descriptions, as well as be maintained in a computer data base. A report will be provided to the Board on the results of this analysis which will identify project and program changes that are needed and identify a list of technology development needs. Both the site-wide and TWRS analyses will be maintained as necessary to support the evolving technical baseline. Changes to these analyses will be reported in the appropriate quarterly status reports to be provided as part of this Plan. Based on current efforts and the commitments of this Plan, DOE and WHC will implement site systems engineering sufficient to begin developing the plans that will drive all programs at Hanford by January 31, 1995 (Commitment 2.1.e).

This systems engineering effort will implement part 2 of the Board's recommendation and fully address the technical issues raised in the April letter. This is the manner in which DOE and WHC will conduct Hanford activities. This approach will also be fostered at other sites in the future.

#### Summary of Section 2.1 Commitments

Commitment 2.1.a	Initial Systems Analysis Report
	Due Date Complete
Commitment 2.1.b	Definitive Answer to Board Questions on MWTF
	Due Date February 18, 1994
Commitment 2.1.c	TWRS Industry/Government Standards Review Report
	Due Date Complete
Commitment 2.1.d	Initial Systems Engineering Analysis Results.
	Due Date June 30, 1994
Commitment 2.1.e	Systems Engineering Based Planning Commences.
	Due Date January 31, 1995

## 2.2 Hanford Site

Decades of nuclear weapons production have left nuclear and chemical wastes, special nuclear materials, and irradiated fuel at the Hanford Site. These wastes include tank waste, contaminated soil and ground water, and contaminated facilities. There are also continuing requirements to safely operate many facilities. The Hanford mission, therefore, includes promptly mitigating waste safety risks, safely operating remaining facilities, and cleaning up the Hanford site in a safe, environmentally sound, and publicly acceptable manner.

Site system engineering started in mid-May 1993. This effort will identify the need and define the boundaries and requirements for the TWRS and other site programs, including environmental restoration activities. A functional analysis is currently being performed based upon this site mission. Preliminary site function trees and Functional Flow Block Diagrams (FFBDs) have been generated. These will be developed further and will be provided to the Board by June 30, 1994 (Commitment 2.1.d). The effort to remediate waste contained in the single and double shell tanks is identified in the site-wide system.

A site requirements analysis is also being performed. Site mission requirements are being developed using the forms, quantities, and composition of the Hanford inventory and imposed schedule and cost constraints. The detailed requirements will be available by June 30, 1994 in a site-wide systems engineering analysis report to be provided to the Board (Commitment 2.1.d).

As a basis for conducting TWRS system engineering, a set of physical, site-wide, interface parameters is being developed. These parameters will utilize assumptions that are consistent with existing regulatory agreements and requirements. There are major issues that must still be resolved. These issues include: defining acceptable cleanup standards, possibly extending storage of high-level waste onsite due to the lack of a national repository, and retention of land for long-term waste management. The assumptions and actions that have been taken to resolve these issues in the site-wide systems analyses will be identified in the June 30, 1994 site-wide systems engineering analyses report (Commitment 2.1.d).

## 2.3 TWRS Program

The TWRS Mission is to store, treat, and immobilize current and future tank wastes and the strontium and cesium capsules. Figure 2 illustrates the current TWRS program, showing the various projects.

The TWRS interfaces to the other site programs will be confirmed or adjusted as the site systems definition evolves. A preliminary functional analysis at the project level has been completed. The results of this analysis, along with project standdown reviews, will support an early evaluation of major TWRS projects.

The system engineering analysis will utilize the requirements of SEN-35-91 and safety requirements contained in codes and standards that can be allocated at the program level.

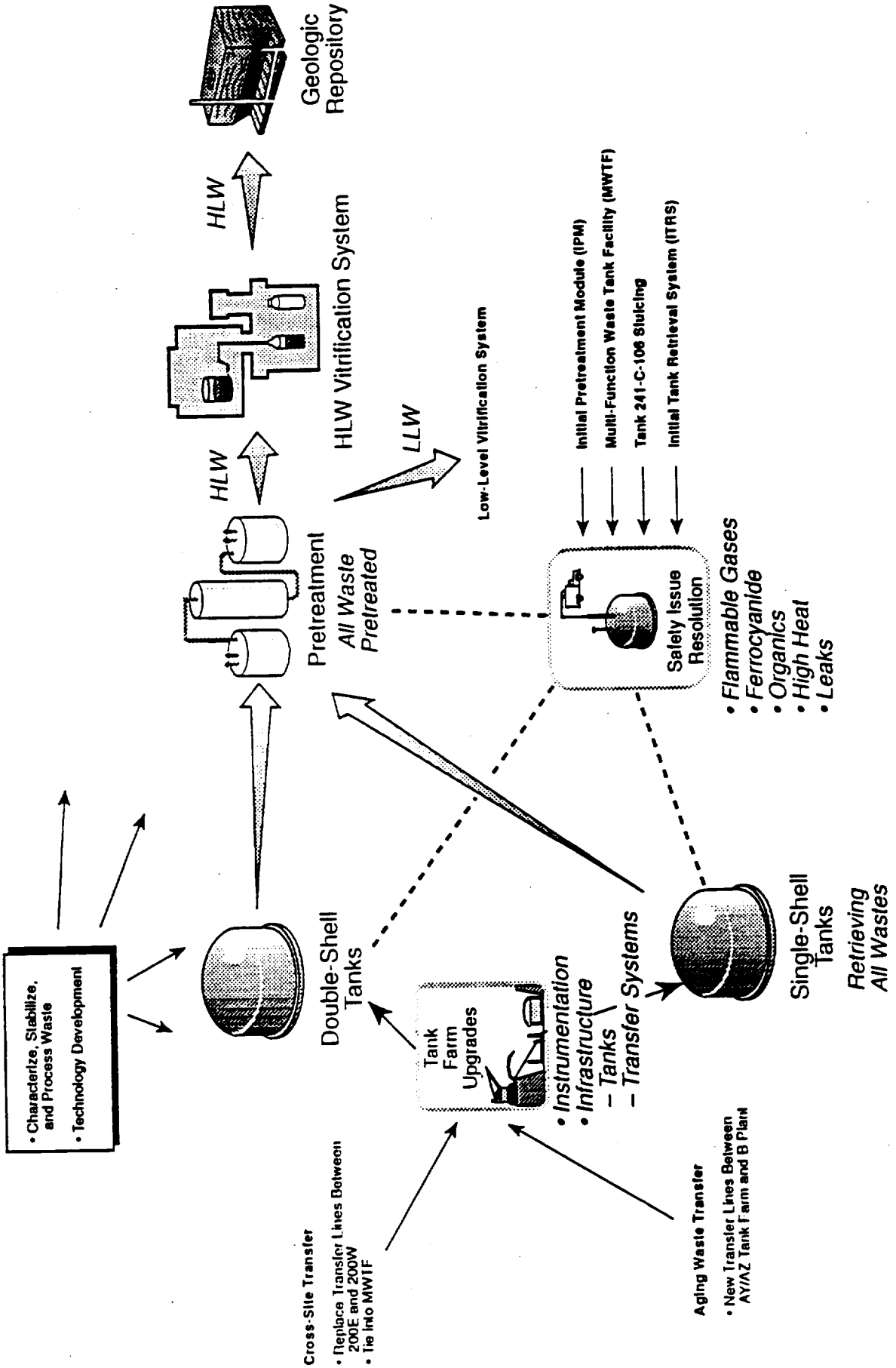
A detailed functional analysis of TWRS will be completed by January 18, 1994 culminating in a report submitted to the Board (Commitment 2.3.a). This analysis will integrate the ongoing site systems engineering results to ensure TWRS remains technically consistent with, and traceable to, the Hanford mission and site-level requirements.

#### Summary of Section 2.3 Commitments

Commitment 2.3.a	Detailed Functional Analysis Report
Due Date	January 18, 1994



Figure 2 TWRS Projects- Current TWRS Approach



## 2.4 TWRS Projects

The current missions for the TWRS projects for which standdown reviews will be conducted are:

- MWTF will provide new double-shell tanks for dilution and storage of waste removed from other tanks that have priority safety issues.
- IPM will pretreat waste to remove cesium and possibly destroy organic and ferrocyanide species, eliminating some major safety issues.
- The Cross Site Transfer System will provide replacement transfer lines between the East and West Tank Farm Areas.
- The Aging Waste Transfer Line project will provide new transfer capability between the A and B Tank Farms and will connect the tanks to HWVP.
- The Tank 241-C-106 Sluicing project will demonstrate retrieval of waste from a single-shell tank and mitigate the high heat safety issue.
- The ITRS will add mixer pump retrieval systems to 10 of 28 existing double-shell tanks.

These projects are in various stages of design and represent large expenditures of funds. The risk of proceeding with the projects before the top-down system engineering is completed must be evaluated. Project standdown reviews will be performed on each project to determine the degree to which project activities should continue until justified by the results of the top-down system engineering work. Reviews initiated after the date of this plan will be conducted by panels composed of qualified personnel external to the project being reviewed and may include recognized experts in the field external to TWRS.

The scope of the reviews will include, but will not be limited to, the project's status, quality assurance, safety analysis (where available), assessment of the adequacy of the design based on required design and interface requirements, and application of codes and standards. Each Standdown Review will consist of the following criteria:

- Conformance to objectives of the project based on systems engineering analysis performed to date.
- Compliance with SEN-35-91 and the Secretary of Energy's TWRS Safety Initiatives, including applicable safety requirements and how they are specified in the design.



- Identification of applicable DOE orders as they pertain to the design and consensus codes and standards and how they are specified in the design.
- Identification of safety-related systems, design adequacy, and how their configuration will be controlled.
- Adequacy of technology development efforts in meeting the needs of the project.
- Identification of missing requirements and verification of assumptions that require resolution.

The initial systems engineering analyses for TWRS has established the functional requirements that projects must satisfy to support the TWRS and site missions. After evaluating each project against these requirements, the standdown review panel will document its findings in a report recommending to the WHC Executive Vice President for Tank Waste Remediation whether the project should continue. These reviews are complete (Commitment 2.4.a). By January 13, 1994 a summary letter report will be submitted to the Board summarizing the results of the reviews and indicating any actions to terminate or redirect projects (Commitment 2.4.b).

In addition to the standdown review of the MWTF project, an external review of this project is being conducted by the Advanced Research and Engineering Sciences (ARES) Corporation. Using preliminary systems engineering results and existing Functional Design Criteria as the bases for the project, the ARES team has developed a review guide to ensure all important aspects of the project are evaluated. The review guide is a deliverable to the Board. This investigative process will be documented as the review proceeds indicating:

- The decisions reached as to the applicability and relevance to the project of specific review item given the current scope and state of completion.
- The acceptability of the project's consideration of the specific item.
- The documents reviewed to reach these conclusions.

The review is complete (Commitment 2.4.c). Decisions to modify the standdown review conclusions will be made by DOE/WHC at the conclusion of the ARES effort.

Subject to satisfactory performance on the above review, it is planned to have ARES perform a similar review of the Tank 241-C-106 Sluicing project. The decision and schedule for this review is complete (Commitment 2.4.d).

**Summary of Section 2.4 Commitments**

<b>Commitment 2.4.a</b>	<b>Standdown Reviews</b>	<b>Complete</b>
	<b>Due Date</b>	<b>Complete</b>
<b>Commitment 2.4.b</b>	<b>Standdown Reviews</b>	<b>Letter Report</b>
	<b>Due Date</b>	<b>January 13, 1994</b>
<b>Commitment 2.4.c</b>	<b>MWTF External Reviews (ARES).</b>	
	<b>Due Date</b>	<b>Complete</b>
<b>Commitment 2.4.d</b>	<b>Decision on Tank 241-C-106 Sluicing External Review.</b>	
	<b>Due Date</b>	<b>Complete</b>

### 3.0 PROGRAM MANAGEMENT

Implementing Part 1 of the Board's recommendation will be accomplished by improvements in the DOE and contractor organizations, and upgrades to program management systems. This section describes these organizational improvements and provides an overview of the project management systems upgrade efforts.

#### 3.1 Organizational Realignment

On May 23, 1993, the Assistant Secretary for Environmental Restoration and Waste Management took formal action to realign the DOE and contractor organizations at Hanford and their contractual relationships. This new organizational strategy views DOE as "Owner", WHC as "Design Authority", and architect/engineers as "Design Agents". This strategy enhances accountability and reduces confusion regarding reporting and direction relationships. This organizational realignment is complete.

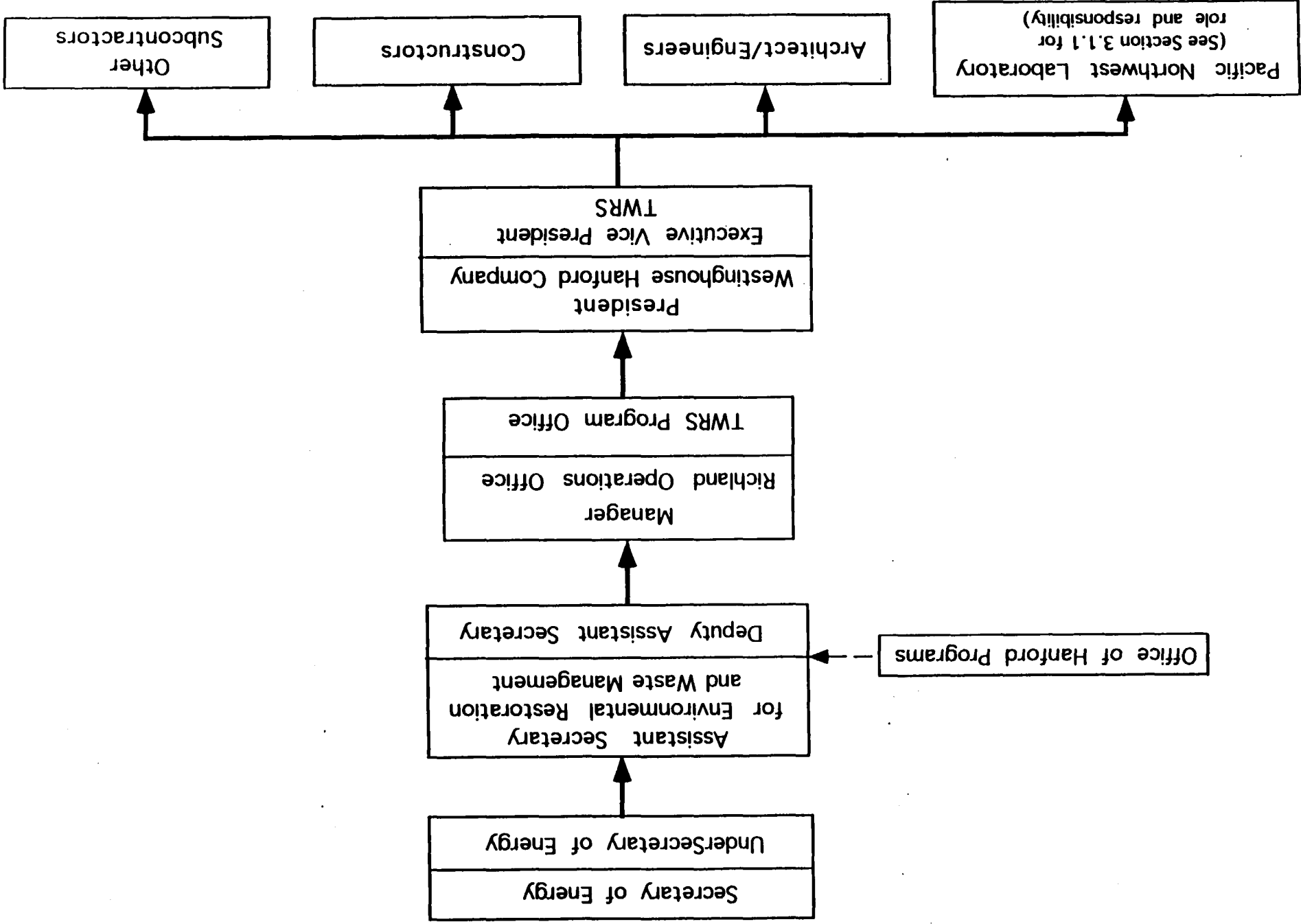
Figure 3 delineates the TWRS organization from DOE-HQ down through the TWRS projects. (Organizational branches outside the TWRS line responsibility have been omitted for clarity.) This figure shows that a clear line of responsibility and accountability exists and flows down from the Secretary, through the Assistant Secretary, the Deputy Assistant Secretary for Waste Management, the Richland Operations Office Manager, the WHC President and the WHC Executive Vice President for TWRS, continuing down into the TWRS management organization. Furthermore, by not only making WHC responsible for ensuring compliance with top-level requirements but also making WHC the single source of technical direction, the management organization has been streamlined, thus improving efficiency.

If the prime contractor changes in the future, technical continuity will be maintained by negotiating the technical baseline documents into the contracts to "anchor" the technical requirements regardless of contractor. In addition, a reasonable transition phase and a specific transition plan will be required for contractor changeover for both the incumbent and future contractors.

The TWRS program is currently reorganizing and developing roles and responsibilities for the new organization. By March 31, 1994, DOE, WHC, and other contractor organizations will develop and provide to the Board Program organizational descriptions for the TWRS program that (Commitment 3.1.a):

- List the technical and administrative disciplines required for each project.
- Show the organizational structure.
- List the specific roles and responsibilities and requisite authority to accomplish those responsibilities.
- Provide the results of an evaluation of technical and managerial qualification review.
- Provide a clear description of the interface relationships between DOE, the projects, and the contractor organizations.
- Provide clear descriptions and functional assignments for technology development efforts and the relationship to the TWRS program.

FIGURE 3: TWRS LINES OF AUTHORITY



This information will be incorporated into the site-wide and TWRS Program Management Plans that will be developed as discussed in Section 3.6. Project summaries of this information will be appended to the TWRS Program Plan as required.

### Summary of Section 3.1 Commitments

Commitment 3.1.a                      Program Organizational Descriptions.  
    Due Date                                      March 31, 1994

### 3.2 Redefinition of Roles and Responsibilities

As the Owner, DOE is responsible for establishing site and program policy and defining the Hanford Mission, and programmatic requirements and objectives in conformance with DOE Orders and commercial nuclear industry standards. DOE monitors and provides oversight of the Design Authority and evaluates and approves changes to the project configurations.

As the Design Authority and M&O Contractor, WHC has primary responsibility for executing the Hanford Mission. This includes defining systems through systems engineering, managing programs and projects, providing the sole source of technical direction to the Design Agents (Architect/Engineers), reviewing and approving Design Agent products and activities, and ensuring that the top-level requirements defined by DOE are met.

As the Design Agents, the Architect/Engineers design the facilities and systems and modifications thereto in accordance with specified requirements and direction from WHC. The Architect/Engineers ensure that the products comply with the appropriate codes and standards.

The constructors build the facilities, install systems and components, modify, deactivate, and dispose of facilities, and turn over completed and accepted facilities to WHC for operation. The Architect/Engineers continue to support facility operations.

As the M&O contractor, WHC has primary responsibility for the technical content and operational activities within programs and projects at the Hanford Site. WHC operations personnel will therefore be well-integrated early into the design process.

As new technology needs of the TWRS program are identified by WHC and communicated to the Pacific Northwest Laboratory (PNL), PNL will be tasked by WHC to:

- 1) Develop a technology development program including candidate technology alternatives to be considered for review and approval by WHC;
- 2) Conduct the lead role for the development of those elements of the technology program approved by WHC; and

- 3) Provide technical support to WHC through scale-up and implementation of the technologies to operational states.

The active involvement and formal relationships between PNL and WHC program and project organizations is intended to ensure that: (a) The technology development activities are integrated into and responsive to the WHC-defined TWRS program and projects, (b) The technology development efforts by PNL keep pace with the programs and projects, and (c) WHC and PNL have the same mission concerning the TWRS.

In accordance with the above, an Integrated Technology Plan (ITP) is being developed for the TWRS program and will be approved by WHC. The ITP is the technology development document that describes the technology planning for the TWRS. WHC, as design authority, establishes integrated technology requirements in the ITP. PNL provides technology products that meet WHC requirements defined in the ITP. This plan will identify the key technology development issues which are outstanding, the schedules and resources required to resolve them, what technology development is actually being done, who is doing it, and the organizational arrangements that have been established to foster this unified approach for the TWRS program. The ITP will be developed by March 31, 1994 and updated at least annually (Commitment 3.2.a).

#### Summary of Section 3.2 Commitments

Commitment 3.2.a	Integrated Technology Plan
	Due Date March 31, 1994

#### 3.3 Staffing, Qualification, and Training

The primary purpose of the TWRS staffing, qualification, and training process is to ensure that TWRS management and technical staff are qualified and competent to perform the functions and activities required of their incumbent positions. The process will provide for a documented mechanism for determining what qualification and training requirements each employee is required to attain prior to the performance of job activities that may affect safety, quality, or the environment. The process will also be designed to give senior management a mechanism for recognizing and rewarding outstanding performance, as well as to train, reassign, demote, or remove staff who do not meet minimum standards.

The staffing, qualification, and training process will include the design and development of management and technical qualification standards based upon the analysis of job performance requirements and the subsequent identification of supporting knowledge, skills, and abilities. These standards will identify the requirements for selection, core (initial) training, job specific training, career development (continued training), and performance evaluation. Staffing analyses are being performed by HQ, RL, and its contractors to determine staffing levels, qualifications, and required training. Based upon the results of the staffing analyses, HQ, RL, and contractor employee training/development plans will be developed to ensure that personnel are capable of performing their assigned tasks prior to conduct of work. The

training plans will identify the requirements, establish the responsibilities, and describe the plan for the continuing qualification and training of personnel assigned to each TWRS position, based on job category and reporting level. The procedure for personnel selection, training, and qualification developed for the Savannah River Site Replacement Tritium Facility is being evaluated for effective application at Hanford. Additionally, the Implementation Plan for DNFSB Recommendation 93-3 will provide guidance for the development and implementation of the staffing, qualification, and training process to be utilized on TWRS. This process will also include the requirements of DOE Order 5700.6C, Criterion 2, "Personnel Training and Qualification."

To ensure the effectiveness and efficiency of the staffing, qualification, and training process, TWRS will provide for assessment of the process on a regular basis. The methodology for assessment shall include internal self-assessment by senior management as well as assessment by technically competent personnel external to the TWRS program. The scope of the assessments will include recruitment and retention, education and career development for RL personnel, as well as contractor personnel. Such assessments will be conducted as early as practical in the process to ensure timely and candid feedback to management. The first independent assessment will be completed by April 30, 1994 and at least once each fiscal year thereafter (Commitment 3.3.a).

#### Summary of Section 3.3 Commitments

<b>Commitment 3.3.a</b>	<b>First Independent Assessment of Staffing, Qualification &amp; Training Process.</b>
<b>Due Date</b>	<b>April 30, 1994</b>

Note: The second assessment will be completed by April 30, 1995 and its results reported in the final quarterly report for the quarter ending in June 1995.

#### 3.4 DOE-HQ and Richland Operations Office (DOE-RL)

DOE-HQ (Office of Hanford Programs) and DOE-RL (TWRS) staffing analyses will be complete and in place by no later than March 31, 1994 (Commitments 3.4.a and 3.4.b). The training and qualification process for will be developed and implemented by no later than May 30, 1994 and will include the Individual Development Plans (IDPs) (Commitments 3.4.c, 3.4.d, and 3.4.e).

Core Training for all TWRS technical and management staff will be fully implemented by May 30, 1994 for all presently assigned RL personnel. New RL employees (assigned to TWRS after May 30, 1994) will receive the TWRS Core Training as soon as is practicable, but no later than 6 months following assignment to the TWRS program. All DOE-HQ (Hanford Program) employees will complete all core training within one year of establishing their Individual Development Plans (Commitment 3.4.f and 3.4.g). Where significant employee training is deemed necessary, DOE will ensure the employee attains the needed training as soon as practicable.

In accordance with DNFSB Recommendation 93-3, the TWRS Technical Base Qualification (Commitment 3.4.h and 3.4.j) and Technical Manager Qualification Standards for HQ (Hanford Programs) and RL (Commitment 3.4.i and 3.4.k) that provide the required technical and managerial competencies required to provide guidance, direction, and oversight of the contractors will be completed no later than August 31, 1994 and October 31, 1994 respectively.

#### Summary of Section 3.4 Commitments

Commitment 3.4.a	HQ (Hanford Programs) Staffing Analysis Due Date	March 31, 1994
Commitment 3.4.b	TWRS RL Staffing Analysis Due Date	March 31, 1994
Commitment 3.4.c	TWRS HQ (Hanford Programs) Individual Development Plans Due Date	May 30, 1994.
Commitment 3.4.d	TWRS RL Training and Qualification Program Due Date	May 30, 1994
Commitment 3.4.e	TWRS RL Individual Development Plans Due Date	May 30, 1994
Commitment 3.4.f	TWRS RL Core Training Complete Due Date	May 30, 1994
Commitment 3.4.g	HQ (Hanford Programs) Core Training Complete Due Date	May 30, 1995
Commitment 3.4.h	TWRS RL Technical Base Qualification Standards Due Date	August 31, 1994
Commitment 3.4.i	TWRS RL Technical Manager Qualification Standards Due Date	October 31, 1994
Commitment 3.4.j	HQ (Hanford Programs) Technical Base Qualification Standards Due Date	August 31, 1994
Commitment 3.4.k	HQ (Hanford Programs) Technical Manager Qualification Standards Due Date	August 31, 1994



### 3.5 Contractors

The WHC TWRS staffing analysis will be completed by March 31, 1994, and will be revised at least annually (Commitment 3.5.a). The WHC TWRS Qualification and Training Plans (QTPs) will be completed by June 15, 1994 (Commitment 3.5.b). The QTPs will emphasize not only fundamentals, but also the enhancement of skills and practices necessary to fully implement a systems approach to work performance and project management.

Where significant employee training is deemed necessary, WHC will ensure that the employees obtain the needed training as soon as practicable. All WHC TWRS employees will complete all training within one year of establishing their QTP.

Supplemental project-specific QTPs will also be prepared, where necessary, and will be applicable to those WHC and subcontract or personnel assigned to specific TWRS projects. Completion of project-specific QTPs will be the responsibility of the respective WHC project management teams in conjunction with the Technical Training organization. Project-specific QTPs will be completed in advance of any new project initiation.

#### Summary of Section 3.5 Commitments

Commitment 3.5.a	WHC TWRS Staffing Analysis
	Due Date March 31, 1994
Commitment 3.5.b	WHC TWRS Training and Qualification Plans
	Due Date June 15, 1994

### 3.6 Program Management Systems

A Site Management Plan was promulgated in August 1992. DOE, WHC, and other contractors are upgrading their program management systems to implement the organization strategy and guide systems engineering and program management. These upgrades will be complete by June 30, 1994 (Commitment 3.6.a), at which time the Hanford Site Management System Directives will be provided to the Board. The upgraded TWRS Program Plan and Program Management Plan will be issued by March 31, 1994 (Commitment 3.6.b and 3.6.c). The major management systems required to successfully implement integrated systems development and systems management at Hanford are:

- Program Management
- Systems Engineering Management
- Configuration Management
- Baseline Management
- Quality Assurance and Safety

In addition, the engineering and management processes will be periodically assessed to meet DOE 5700.6C, Criterion 10 (Independent Assessments) requirements through implementation of the TWRS Systems Engineering Management Plan and Program Management Plan.

### Summary of Section 3.6 Commitments

Commitment 3.6.a	Hanford Site Management System Directives
Due Date	June 30, 1994
Commitment 3.6.b	Upgraded TWRS Program Plan
Due Date	March 31, 1994
Commitment 3.6.c	Upgraded TWRS Program Management Plan
Due Date	March 31, 1994

### 3.7 Systems Engineering Management

Systems engineering management will be described in SEMP's and implemented by procedures. A Draft Site SEMP will be completed by March 31, 1994 (Commitment 3.7.a) with the final Site SEMP issued June 30, 1994 (Commitment 3.7.b). A TWRS SEMP has been drafted by WHC and is scheduled for issue by March 31, 1994 (Commitment 3.7.c). Implementing procedures are being identified. TWRS procedures will be modified or added as necessary by July 15, 1994 (Commitment 3.7.d). Sitewide draft procedures will be developed by September 30, 1994 (Commitment 3.7.e).

The TWRS SEMP will include the project system engineering process. The process will cover the entire program and project life cycles, from need identification to deactivation and disposal. A key element of the process will address requirements identification, including safety requirements imposed by law, Safety Initiatives, SEN-35-91, DOE Orders, and applicable consensus codes and standards. The methods of identifying and documenting safety-related systems and components will also be included. Comprehensive technical reviews will be defined in the SEMP's to ensure that engineering products are verified and that all requirements are reflected in those products.

Assessment of technical (including environmental, safety, and health [ES&H]) and economic risk will be described in the SEMP. Various types of technical risk will be considered, for example: technology maturity, compatibility, and safety. These risks will be part of the decision criteria used when selecting technologies and design approaches. In addition, ES&H risks associated with the design, selection, and operations of systems and components will be an essential part of the system engineering requirements development and the design processes. Comprehensive design verification, with emphasis on verifying that all aspects of the systems design will meet ES&H requirements, will be used to minimize risk. Other programmatic criteria will also be used for decision-making, such as stakeholder inputs and economic analyses (e.g., life cycle cost, value engineering). At no time will ES&H be compromised due to programmatic considerations.

Definitive risk management policies are being developed and will be referenced or included in the SEMP when they are complete. Until the policies and associated methods are implemented in the TWRS and Site Wide procedures, risks will be evaluated qualitatively based on extensive site experience available through various technical disciplines and ES&H organizations.

### Summary of Section 3.7 Commitments

Commitment 3.7.a	Draft Site SEMP Due Date	March 31, 1994
Commitment 3.7.b	Final Site SEMP Due Date	June 30, 1994
Commitment 3.7.c	TWRS SEMP Due Date	March 31, 1994
Commitment 3.7.d	TWRS SEMP Implementing Procedures Due Date	July 15, 1994
Commitment 3.7.e	Draft Site SEMP Implementing Procedures Due Date	September 30, 1994

### 3.8 Configuration Management

The TWRS Configuration Management Plan will be the top level policy document governing technical, cost, and schedule configuration control within the TWRS program. It will be developed by Westinghouse Hanford Company and approved by the DOE Richland Operations Office. It will form the basis for the development of lower level implementation documents and procedures. This complete set of documentation will be continually developed as the program evolves. The TWRS Configuration Management Plan will be issued for review by January 31, 1994 (Commitment 3.8.a) and issued as an approved document with the remainder of the TWRS documentation by March 31, 1994 (Commitment 3.8.b).

### Summary of Section 3.8 Commitments

Commitment 3.8.a	Draft TWRS Configuration Management Plan Due Date	January 31, 1994
Commitment 3.8.b	Final TWRS Configuration Management Plan Due Date	March 31, 1994

### 3.9 Baseline Management

An integrated approach to site, program, and project baseline planning is being implemented to ensure that baselines reflect the systems engineering work that must be managed and the system engineering results, where applicable. Fully functioning TWRS baselines will be in place by March 31, 1994 (Commitment 3.9.a). Baseline Management is described in the Site

Management System and the draft TWRS Program Management Plan. For each project, a total project baseline will be established for all activities through completion of the project, based on program needs and commitments established in TWRS and sub-tier documentation. The total baseline includes the technical scope, schedule, and cost baselines.

Changes to project baselines will be controlled through submittal and approval of change requests. Change control will be in accordance with the site-wide and TWRS program change control procedures. Change boards for specific projects will be established to review and act on the proposed change requests. A change control administrator will be assigned to process and track the changes through the system. Levels of control will vary depending on the size and complexity of each project, and may be more stringent than program level controls. Details of the change control process for each project and program will be documented in the Program Management Plan.

### Summary of Section 3.9 Commitments

Commitment 3.9.a	TWRS Baselines Due Date	March 31, 1994
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### 3.10 Quality Assurance and Safety

A TWRS Quality Management Plan and a TWRS Safety Management Plan provide the management policy and direction for embedding quality and safety into the culture and processes used throughout the TWRS program. These plans are supporting documents for the TWRS Program Management Plan.

Of particular interest to the Board, the goal of the Safety Management Plan is to enhance and protect the nuclear and radiological safety of the environment, public, and workers at the Hanford Site in accordance with DOE policy, orders, and requirements with special emphasis on engineered features. The Safety Management Plan will concentrate on the safety bases of the program and projects. Particular attention will be paid to details of how the following critical elements of safety are managed:

- Safety Analyses
- Operational Safety Requirements
- Control of Unreviewed Safety Questions
- Limiting Conditions of Operations

Other aspects of the Safety Management Plan will include a discussion of radiological protection; emergency preparedness; conduct of operations; notification, investigations, and reporting of occurrences; personnel training and qualification; audits and surveillances; trending and safety performance; issues management; and records management and reporting.

The TWRS Quality Management Plan and the Safety Management Plan have been drafted and will be issued by March 31, 1994 (Commitment 3.10.a and 3.10.b).

During FY 1992, the DOE issued three DOE Orders for safety compliance:

- 5480.21 Unreviewed Safety Questions
- 5480.22 Technical Safety Requirements
- 5480.23 Nuclear Safety Analysis Reports

On August 20, 1993, WHC issued an Implementation Plan for these Orders. The WHC Implementation Plan discusses and references current operational safety requirements (OSRs) for existing TWRS facilities. Limiting Conditions of Operations are contained within the OSRs. The plan also discusses the Interim Safety Basis (ISB) documentation strategy for single-shell and double-shell tank farms.

#### Summary of Section 3.10 Commitments

- |                   |                              |
|-------------------|------------------------------|
| Commitment 3.10.a | TWRS Quality Management Plan |
| Due Date          | March 31, 1994               |
| Commitment 3.10.b | TWRS Safety Management Plan  |
| Due Date          | March 31, 1994               |

#### **4.0 REPORTING REQUIREMENTS**

The Department will prepare quarterly reports updating the progress and significant accomplishments made in implementing the 92-4 Implementation plan initiatives.

##### **Discussion:**

The quarterly reports will contain progress discussions on the various initiatives. The report will highlight ongoing efforts, review completion dates and upcoming milestones, discuss the upcoming quarter's activities, and note any concerns.

##### **Responsibility:**

The RL Program Manager for the Tank Waste Remediation System (TWRS) will have the primary responsibility for providing quarterly reports with assistance from the Management and Operating Contractor.

**Commitment 4.a** - Quarterly progress reports will be issued within 30 days of the end of every calendar quarter. The first quarterly report will be issued by April 1994.

The initial report will be issued containing activities performed in the first quarter of calendar year 1994, and will contain a suggested format and schedule for future reports.

<b>Deliverable</b>	Quarterly report issued to DNFSB
<b>Due Date</b>	First report sent by April 1994, last report scheduled for June 1995

## **5.0 IMPLEMENTATION PLAN CHANGE CONTROL**

The 92-4 Implementation Plan is a complex and long range plan. Flexibility is needed to address changes in commitments, actions or completion dates where modifications are necessary due to additional information, project refinements, or changes in DOE's baseline assumptions.

### **Purpose:**

To provide a change control process to handle implementation course corrections or process change.

### **Discussion:**

The 92-4 Implementation Plan is based on certain assumptions. These assumptions were used to develop commitment dates. If outyear significant funding, FTE level, or mission changes occur, the original date for commitments may require modification. Any anticipated significant changes in completion dates and department commitments will be promptly brought to the attention of the DNFSB prior to the passing of the completion date, formally discussed in the quarterly progress reports including appropriate corrective actions, and where appropriate submitted to the DNFSB as a revision to the Implementation Plan.

**Commitment 5.a** - Substantive changes in a Department commitment or commitment completion date will be formally submitted. The Implementation Plan will be revised and resubmitted as appropriate.

**Deliverable**            Revised Implementation Plan

**Due Date**             As required

**Commitment 5.b** - Changes to interim milestones and schedules will be formally addressed and assessed in the quarterly progress reports.

**Deliverable**            Discussion in quarterly report

**Due Date**             As required in conjunction with quarterly report schedule

## Attachment A

### List of Acronyms and Abbreviations

ARES	Advanced Research and Engineering Sciences
CSB	Canister Storage Building
DOE	Department of Energy
FFBD	Functional Flow Block Diagrams
HQ	DOE Headquarters
HWVP	Hanford Waste Vitrification Plant
IDP	Individual Development Plan
IPM	Initial Pretreatment Module
ISB	Interim Safety Basis
ITP	Integrated Technology Plan
ITRS	Initial Tank Retrieval System
M & O	Management and Operating
MWTF	Multi-Function Waste Tank Facility
PNL	Pacific Northwest Laboratory
QTP	Qualification and Training Plans
RL	DOE Richland Operations Office
SEMP	System Engineering Management Plan
SEN	Secretary of Energy
TWRS	Tank Waste Remediation System Program
WHC	Westinghouse Hanford Company



**ATTACHMENT B : 92-4 PRODUCT/COMMITMENT SCHEDULE**

**DUE DATE**

**DELIVERABLE COMMITMENT**

**COMMITMENT**

**SITE-WIDE COMMITMENTS**

2.1.d	Initial Systems Engineering Analysis Results	6/30/94
2.1.e	Systems Engineering Based Planning Commences	1/31/95
3.6.a	Site Management System Directives	6/30/94
3.7.a	Draft Site Systems Engineering Mgmt Plan	3/31/94
3.7.b	Final Site Systems Engineering Management Plan	6/30/94
3.7.e	Draft Site SEMF Implementing Procedures	9/30/94

**TWRS PROGRAM COMMITMENTS**

2.1.c	TWRS Industry/Government Standards Review Report	Complete
2.1.a	Initial Systems Analysis Report (Functional and Top-Level Requirements)	Complete
2.3.a	Detailed Functional Analysis Report	1/18/94
3.1.a	Program Organizational Descriptions	3/31/94
3.2.a	Integrated Technology Plan, with annual updates.	3/31/94
3.3.a	First Independent Assessment of Staffing, Qualification & Training Process	4/30/94
3.3.a	Second Independent Assessments of Staffing, Qualification & Training Process	4/30/94
3.4.a	HQ (Hanford Programs) Staffing Analysis	3/31/94
3.4.b	TWRS RL Staffing Analysis	3/31/94
3.4.c	TWRS HQ (Hanford Programs) Individual Development Plans	5/30/94
3.4.d	TWRS RL Training & Qualification Program	5/30/94
3.4.e	TWRS RL Individual Development Plans	5/30/94
3.4.f	TWRS-RL Core Training Complete	5/30/94
3.4.g	HQ (Hanford Programs) Core Training Complete	5/30/95
3.4.h	TWRS RL Technical Base Qualification Standards	

**DUE DATE**

**DELIVERABLE COMMITMENT**

**COMMITMENT**

TWRS PROGRAM COMMITMENTS (cont'd)

3.4.i	TWRS RL Technical Manager Qualification Standards	8/31/94
3.4.j	HQ (Hanford Programs) Technical Base Qualification Standards	8/31/94
3.4.k	HQ (Hanford Programs) Technical Manager Qualification Standards	8/31/94
3.5.a	WHC TWRS Staffing Analysis, with annual updates	3/31/94
3.5.b	WHC TWRS Qualification & Training Plans	6/15/94
3.6.b	TWRS Program Plan	3/31/94
3.6.c	TWRS Program Management Plan	3/31/94
3.7.c	TWRS Systems Engineering Management Plan	3/31/94
3.7.d	TWRS SEMIP Implementing Procedures	
3.8.a	Draft TWRS Configuration Management Plan	1/31/94
3.8.b	Final TWRS Configuration Management Plan	3/31/94
3.9.a	TWRS Baselines	3/31/94
3.10.a	Quality Management Plan	3/31/94
3.10.b	Safety Management Plan	3/31/94

PROJECT COMMITMENTS

2.1.b	Definitive Answer to Board Questions on MWTf	2/18/94
2.4.a	Shutdown Reviews Complete	complete
2.4.b	Shutdown Review Letter Report	1/13/94
2.4.c	MWTf External Reviews (ARES)	complete
2.4.d	Decision on Tank 241-C-106 Siting External Review	complete
3.1.a	Project Organizational Descriptions	3/31/94

COMMITMENT

DELIVERABLE COMMITMENT

DUE DATE

92-4 CONTINUING COMMITMENTS

4.a	Quarterly Status Reports to start 4/94	
5.a	Formal notice of substantive changes to DOE commitments or commitment due dates	As required
5.b	Changes to interim milestones and schedules noted in quarterly reports	As required