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1	1	Cog. Mgr.R. E. Raymond	[signature]	12/31/97	R2-38						
		QA									
		Safety									
		Env.									

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S. H. Rifaey [signature] 12/31/97	M. A. Payne [signature] for 12/31/97	R. E. Raymond [signature] 12/31/97	Ctrl. No. N//A
Signature of EDT Originator / Date	Authorized Representative for Receiving Organization / Date	Design Authority/ Cognizant Manager / Date	[] Approved [] Approved w/comments [] Disapproved w/comments

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Tank Waste Remediation System Engineering Plan

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Abstract: This Engineering Plan describes the engineering process and controls that will be in place to support the Technical Baseline definition and manage its evolution and implementation to the field operations. This plan provides the vision for the engineering required to support the retrieval and disposal mission through Phase 1 and 2, which includes integrated data management of the Technical Baseline. Further, this plan describes the approach for moving from the "as is" condition of engineering practice, systems, and facilities to the desired "to be" configuration. To make this transition, Tank Waste Remediation System (TWRS) Engineering will become a center of excellence for TWRS which will perform engineering in the most effective manner to meet the mission. TWRS engineering will process deviations from site-wide systems if necessary to meet the mission most effectively.

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EXECUTIVE SUMMARY

This Engineering Plan describes the engineering process and controls that will be in place to support the Technical Baseline definition and manage its evolution and implementation to the field operations.. This plan provides the vision for the engineering required to support the retrieval and disposal mission through Phase 1 and 2, which includes integrated data management of the Technical Baseline. Further, this plan describes the approach for moving from the "as is" condition of engineering practice, systems, and facilities to the desired "to be" configuration. To make this transition Tank Waste Remediation System (TWRS) Engineering will become a center of excellence for TWRS which will perform engineering in the most effective manner to meet the mission. TWRS engineering will process deviations from site wide systems if necessary to meet the mission most effectively.

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CONTENTS

APPENDIX

LIST OF FIGURES

LIST OF TERMS

DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
LMHC	Lockheed Martin Hanford Corporation
PHMC	Project Hanford Management Contract
RCRA	*Resource Conservation and Recovery Act of 1976*
TWRS	Tank Waste Remediation System
USQ	unreviewed safety question

TANK WASTE REMEDIATION SYSTEM ENGINEERING PLAN

1.0 INTRODUCTION

This document provides an overview of the engineering processes that will be used to support successful accomplishment of the Tank Waste Remediation System (TWRS) missions. This document is one of the tools used to develop and control the mission work as depicted in Figure 1. It outlines processes rooted in fundamental systems engineering concepts and addresses defining and maintaining the Technical Baseline for existing plant hardware, projects under construction, and new projects to be defined by mission needs. Visions of roles and responsibilities, technical change control, configuration management, and document control (with integrated data management of the Technical Baseline) are also discussed. This document reflects a future state for TWRS engineering processes that will be in place to support the retrieval mission. To make this transition TWRS Technical Operation and Engineering will become a center of excellence for TWRS which will perform engineering in the most effective manner to meet the mission. TWRS engineering will process deviations from site-wide systems if necessary to meet the mission most effectively.

2.0 OVERVIEW OF TANK WASTE REMEDIATION SYSTEM ENGINEERING PROCESS

The engineering process ensures that the Technical Baseline is consistent with and supports the mission and requirements. It also ensures that the physical plant systems and the documentation that defines them are consistent.

Technical authorities (see Section 3.0) control the Technical Baseline through a process flow of five tasks: (1) Determining Requirements; (2) System Evaluation; (3) Verification of Existing Technical Baseline; (4) Design, Construction, and Installation of New Hardware; and (5) Managing the Technical Information used for operations and maintenance. The engineering process is shown in Figure 2 and is summarized as follows (see U.S. Department of Energy (DOE) Order 430.1, *Life Cycle Asset Management*, for the base requirements/source for this process).

Figure 1. Readiness to Proceed Document Hierarchy.

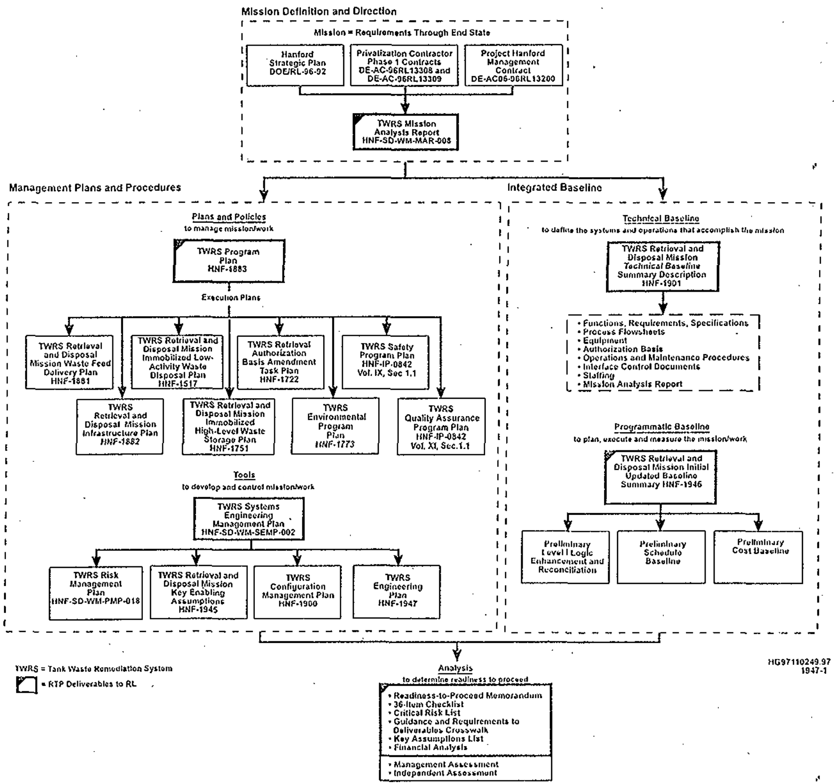
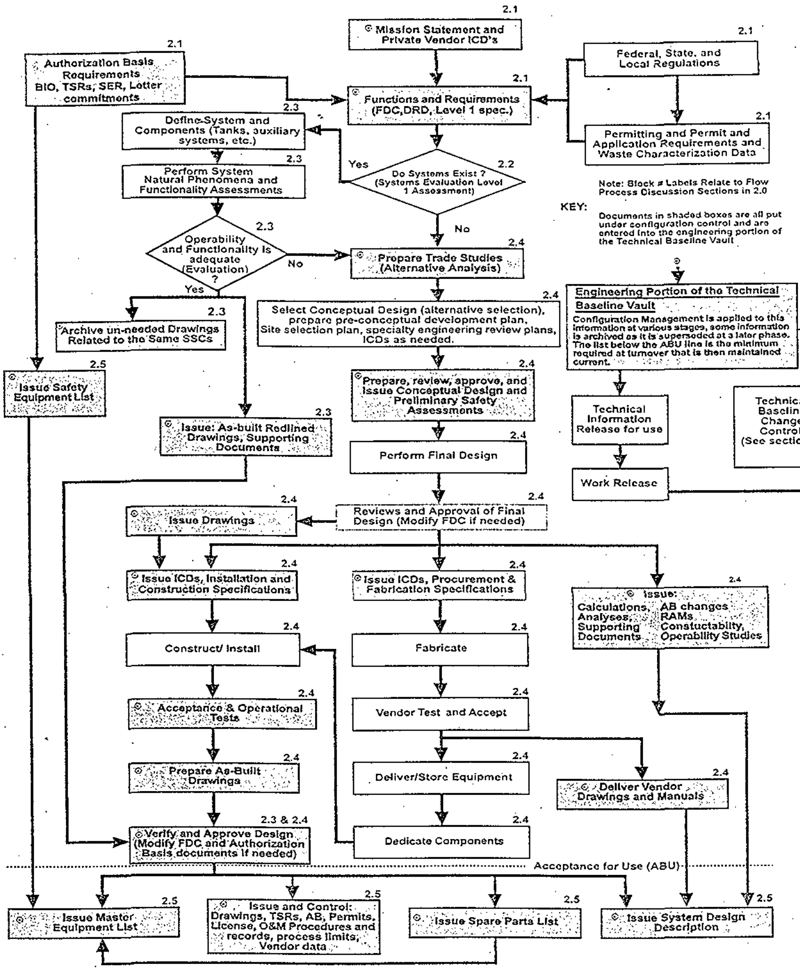


Figure 2. Engineering Process Flow Diagram



AB	=	Authorization Basis
ABU	=	Acceptance for Beneficial Use
BIO	=	Basis for Interim Operations
DRD	=	Data Requirements Document
FDC	=	Functional Design Criteria
ICD	=	Interface Control Document
O&M	=	Operations and Management
RAM	=	Reliability, Availability and Maintainability
SER	=	Safety Evaluation Report
SSC	=	Structures, Systems and Components
TSR	=	Technical Basis Report

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2.1 DETERMINING REQUIREMENTS

Functional requirements are produced by the technical authorities based upon regulations, DOE Orders, and mission needs (see HNF-SD-WM-SEMP-002, *Tank Waste Remediation System Systems Engineering Management Plan* (Peck 1998). Requirements come from a variety of sources: federal regulations (e.g., U.S. Environmental Protection Agency [EPA]; National Pollutant Discharge Elimination System; 10 CFR 830, "Nuclear Safety Management," Section 120, "Quality Assurance Rule"); State regulations (e.g., Washington State Department of Ecology [Ecology]); local regulations; DOE Orders and guidance documents; and compliance documents and commitments prepared in accordance with regulations and orders (*Resource Conservation and Recovery Act of 1976* [RCRA] Part B Permit, Authorization Bases, Natural Phenomenon Requirements, etc.). Requirements are also derived from waste characterization data. Mission needs are defined by upper-tiered system engineering processes. Mission needs are also defined in the technical agreements between TWRS and the private vendors managing the disposal facilities. These agreements are called Interface Control Documents. Revalidation for contracts in the construction phase will not be performed. These processes result in formal documentation outlining technical criteria necessary to meet mission needs. These criteria are either issued in high-level Functions and Requirements documents or specific Functional Design Criteria documents.

2.2 SYSTEM EVALUATION

The next task area is a high-level system analysis to determine if the appropriate hardware exists to achieve completion of the functional requirements. This evaluation is performed on a system level as the first step in the iterative process of ensuring adequate hardware. If a system evaluation concludes that adequate hardware systems are in place, the next effort will be to verify that the structures, systems, and components meet specified criteria. If a system evaluation concludes that hardware is not in place (e.g., additional mixer pumps for waste storage tanks) then design and construction of new hardware is needed.

2.3 VERIFICATION OF EXISTING TECHNICAL BASELINE

If the systems are in place then a more detailed analysis is performed to ensure that the functionality and operability of the entire Technical Baseline (e.g., tanks and auxiliary systems) will perform adequately to meet mission needs. Additional new components may need to be installed as a result of this further evaluation. This additional evaluation is shown in the process flow chart as a return to the system evaluation process step. The Technical Baseline (drawings, supporting documents, software, etc.) is revised accordingly to identify those functions which meet mission needs and then place them under configuration control (e.g., red-line and as-built drawings). If systems are not in place then new systems must be installed per Section 2.4. Former Technical Baseline information, no longer required to support the mission, is archived.

During this phase specialty engineering analyses may be performed per procedures to verify functionality and physical integrity of existing systems. These include reliability, availability, maintainability, operability, human factors, and life cycle cost evaluations. This analysis may require detailed field walk downs and formal tests. Assessments against revised general design criteria, such as natural phenomena hazards criteria, will need to be performed if facility structures, systems, or components are modified or upgraded.

2.4 DESIGN, CONSTRUCTION, AND INSTALLATION OF NEW HARDWARE

Alternatives analysis, which includes trade-off /engineering studies, and conceptual design documents are initiated and completed using design agents as appropriate, once formal evaluation has assured the need for new or modified hardware. This documentation considers decontamination and decommissioning when appropriate. Preliminary safety analysis reports are produced as part of the conceptual design effort. The technical authorities (see Section 3.0) provide Technical Baseline expertise during the production of these documents. Concept approval is then performed by technical authorities. Similarly, new design is initiated, supported with expertise, and approved. During these evaluation and approval steps additional specialty engineering reviews and analyses will be performed or requested by the technical authorities. Analyses performed outside of the technical authority purview include reviews by independent TWRS technical organizations such as Environmental, Nuclear or Industrial Safety, and Quality Assurance. This effort may also include reliability, availability, and maintainability evaluations. Value Engineering concepts are applied as needed to assure proper comparison of technical options. Compliance matrices are prepared to ensure that design is in accordance with functional requirements. The compliance matrixes include a revalidation that any revised Interface Control Documents are properly represented by functional criteria, and include the review that Natural Phenomenon requirements (seismic and windloading) are met.

This phase includes preparation of specifications and calculations, fabrication and initial acceptance testing, any commercial grade dedication, installation, temporary facility/structure set up, and issuance of as-built Technical Baseline media. The technical authorities interface throughout this phase as defined by applicable contracts. This may include deliverance of existing Technical Baseline documents, reviews and approvals, test witnessing/validating, inspection, and criteria revision. Lastly, the technical authority verifies, approves, and accepts the new Technical Baseline. This development and approval process is iterative and sometimes requires criteria and design modification. Authorization Basis documentation (e.g., final safety analysis reports) and alternative studies are also revised and issued in this phase.

All analysis, document development, review and approval, and project design support are conducted in accordance with upper-tiered Project Hanford Management Contract (PHMC) procedures and TWRS-specific implementing procedures contained within HNF-IP-0842, *TWRS Administration* (LMHC 1997). These procedures are based upon DOE Orders and guidance documents and upon industry practice.

2.5 MANAGING THE TECHNICAL INFORMATION USED FOR OPERATIONS AND MAINTENANCE

Several sources of information for operations and maintenance are produced and maintained as part of the engineering process. These sources include such items as Master and Safety Equipment lists, spare parts lists, essential drawing lists, vendor information, commercial grade item (CGI) dedications, and calibration and surveillance records. More detailed analyses to ensure proper reliability, availability, and maintainability of the physical hardware for meeting mission needs will be performed after completion of installation and testing. This work would be performed if no other analyses were previously performed, or if final design, testing, or criteria changes may impact previous analyses. Lastly, to ensure proper operability of physical hardware, system design descriptions are issued qualifying operational technical parameters (interlocks, software interactions, set points), lessons learned, and process improvements. Section 5.0 includes a discussion of the configuration management of this technical information used to for operations and maintenance.

3.0 ROLES AND RESPONSIBILITIES IN THE ENGINEERING PROCESS

This section contains a discussion of roles and responsibilities for Technical Baseline production and management. Functions which provide TWRS approval authority for all aspects of the Technical Baseline achieve their authority from the Configuration Control Change Board and are termed "technical authorities." The technical authorities are the Design Authority and Cognizant Engineer. The application of their authority is based upon the safety significance of the hardware they support: *safety* structures, systems, and components are managed by Design Authorities, and *non-safety* structures, systems, and components are managed by Cognizant Engineers. This safety designation is defined in facility Authorization Bases and refined in detail through Safety Equipment Lists.

3.1 DESIGN AUTHORITY

The Design Authority (one of the technical authorities, along with the Cognizant Engineer) is the person responsible for the final acceptability of a safety structure, system, or component and its Technical Baseline. The highest level of qualifications and training are required for this position since this type of hardware has the greatest potential for affecting mission cost and schedule, personnel safety, and the environment. Further specific activities are defined in facility administrative procedures and includes technical support to potential Authorization Basis changes (unreviewed safety question [USQ] activities).

3.2 COGNIZANT ENGINEER

The Cognizant Engineer (one of the technical authorities, along with the Design Authority) is the person responsible for the final acceptability of a non-safety structure, system, or component and its Technical Baseline. The roles here related to the Technical Baseline are similar to that of the Design Authority. The qualifications and training are less rigorous than those applied to the Design Authority because the potential impact of non-safety structures, systems, and components are less on mission, safety, and the environment. Specific functions are defined further in facility administrative procedures and include technical support to maintenance testing, and support of operational activities such as facility transfers.

3.3 DESIGN AGENT

The Design Agent is the person, group, organization, or firm responsible to provide the design in accordance with agreed requirements specified by the technical authorities. Normal design agent activities are conducted by personnel other than TWRS technical authorities.

3.4 PROJECT ENGINEER

The Project Engineer is the person responsible for management of the cost, schedule, Technical Baseline, design, construction, and release/turnover, of new projects. The project engineer coordinates design authority, design agent, and cognizant engineer responsibilities associated with cross-discipline design.

3.5 PROGRAM ENGINEER OR PROGRAM MANAGER

The Program Engineer or Program Manager (depending on the scope of the program) is the person responsible for assuring that the requirements are established and met by the project (technical requirements are specified by the technical authorities discussed above, i.e., the cognizant engineer or the design authority), and is responsible for the budget and is responsible for customer interface.

3.6 CONFIGURATION CHANGE CONTROL BOARD

The Configuration Change Control Board is established by the Director, TWRS Engineering, and is accountable to the President of Lockheed Martin Hanford Corporation (LMHC) or designee. The Configuration Change Control Board has the authority to approve Technical Baseline changes that affect the form, fit, function, cost, or schedule. The Configuration Change Control Board also is responsible for screening and classifying (for approval level) change requests in accordance with the Technical Baseline Change Control process discussed in Section 4.0.

4.0 TECHNICAL BASELINE CHANGE CONTROL

During the course of performing the Engineering Process (see Section 2.0 above) and achieving mission success, changes that affect Technical Baseline will be controlled in accordance with this process. The existing change control process is currently being reengineered. The new change control model is summarized in Figure 3 and described below. It incorporates front-end screening of proposed technical changes to evaluate potential impacts to cost and schedule baselines, establish levels of change control, and integrate the various change control processes. The approved configuration and changes are tracked.

4.1 INITIATE REQUEST

Anyone can identify a need for a change. Interfacing processes (e.g., unreviewed safety question, work management, programmatic change control) often identify needs. A form will be used to document the initiation of a request for change. The form identifies the initiator, main configuration item and documentation affected, problem, proposed solution, urgency, and other information that can be defined by the initiator.

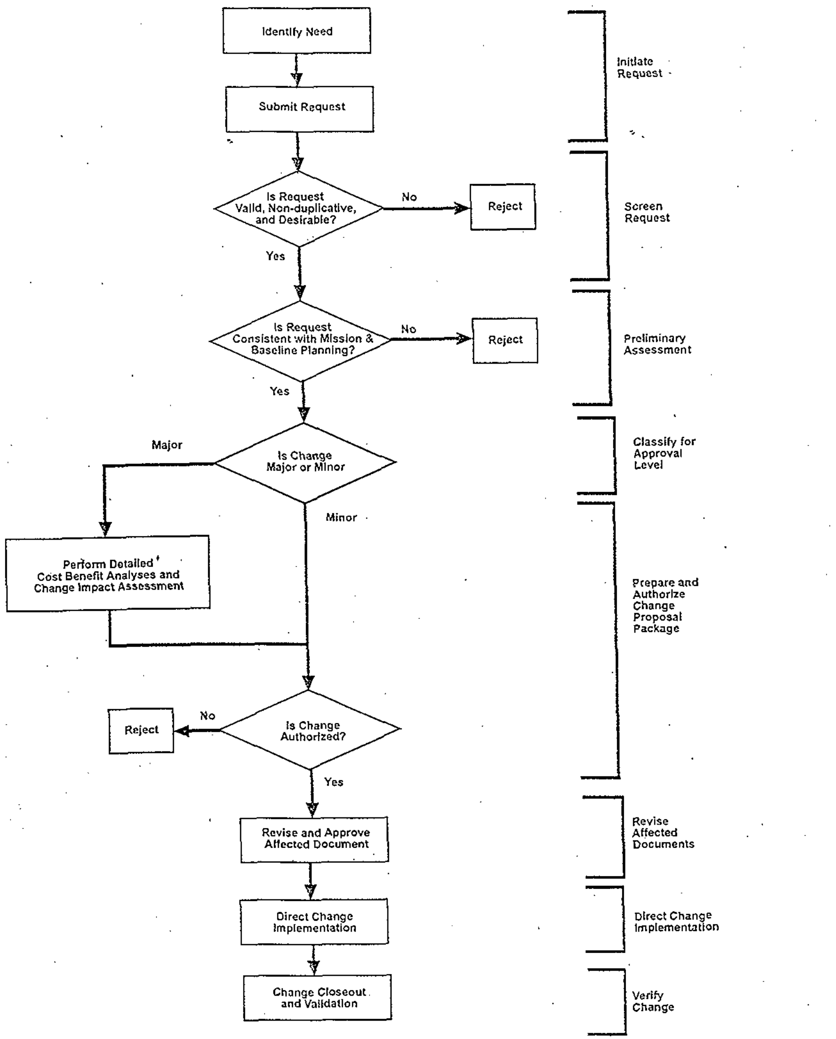
4.2 SCREEN REQUEST

The initial request is examined against predefined criteria to determine whether it is nonduplicative, valid, and desirable. Screening identifies the primary area of impact (ownership) and required routing of the request. Rejected requests are returned to the user with the reason for rejection. Those accepted are assigned unique identifiers and forwarded via the selected routing. This action is done under the cognizance and authority of the Configuration Change Control Board.

4.3 PRELIMINARY ASSESSMENT

The request is assessed for consistency with the currently defined program mission and baseline planning. A request that is not within the authorized work scope is rejected. (The requestor may submit a baseline change request (programmatic) to support the requested technical change.) The areas impacted and a rough order of magnitude of those impacts are documented and used to identify what resources need to be involved in the development and review of the change package.

Figure 3. Technical Baseline Change Control Process.



4.4 CLASSIFY FOR APPROVAL LEVEL

Based upon the preliminary assessment, the appropriate level of approval is identified for the change package based on a set of predefined criteria. The proposed change is categorized as either a major, or minor change. The level of approval and any change control board membership varies by category. The configuration change control board is the final approval authority for the change. This board identifies the person responsible for directing change planning and implementing the change in all affected parts of the Technical Baseline.

4.5 PREPARE AND AUTHORIZE CHANGE PROPOSAL PACKAGE

The level of rigor involved in the preparation and approval of the change proposal is based on whether the change is major or minor. Impacts are identified and evaluated and details of the change proposal developed. The costs and benefits of implementing the change are evaluated and identified in the level of detail appropriate to the change category. Major changes require a documented detailed cost-benefit analysis and change impact assessment. Results of an assessment of a "minor" change's costs, benefits, and impacts are part of the change proposal package, but are not required to be documented separately. This information will be used by the approval authority, as designated by the configuration change board, to make the approve/reject decision. In some cases the evaluation may result in a change to the approval level. The two basic change categories (major, minor) are addressed below.

- Major Change - Major changes are approved by the Configuration Change Control Board that includes the cognizant design authority and other impacted groups. Allocation of resources to develop the change package is determined in conjunction with priorities of all participants. Change package development will be deferred to coincide with field organization priorities or plant mode conditions.

- Minor Change - Minor changes are approved by the cognizant design authority or the cognizant manager of a technical procedure as appropriate. Field work-in-progress change requests are included in this category. Change package development will be deferred to coincide with field organization priorities or plant mode conditions.

4.6 REVISE AFFECTED DOCUMENTS

Change notices are used to implement the proposed change once it is authorized. The change notice(s) is developed, reviewed, and the technical accuracy of the details verified. The sequencing will vary according to the category of the change. Major and minor changes will be documented prior to implementation, but the extent will vary. Technical approval of change notices and documentation is determined in accordance with approval designator criteria.

4.7 DIRECT CHANGE IMPLEMENTATION

A single point of contact coordinates implementation of the change, which includes such aspects as construction and installation. A controlled process is used that includes determining what items must be changed (e.g., schedules, budgets, technical documents, training requirements, equipment lists, drawing lists, Authorization Basis amendments) and the detailed schedule for their change.

4.8 CHANGE CLOSEOUT AND VALIDATION

Implementation of the change is verified, including testing of physical and procedural changes and as-builting. Closeout of the change is accomplished only when the necessary parts of the Technical Baseline have been verified as being consistent with the approved change.

5.0 CONFIGURATION MANAGEMENT/DOCUMENT CONTROL

Having established a Technical Baseline, there is a need to maintain configuration control and provide easy access to the information in the Technical Baseline. The Configuration Management/Document Control process that is to be used is as follows:

The configuration of the Technical Baseline is managed from development to disposal through baseline development, configuration status, and change control with designated approval authorities. These processes ensure that physical plant systems and the documentation that defines them are consistent. The process is outlined in HNF-1900, *Tank Waste Remediation System Configuration Management Plan* (Vann et al. 1998).

There is a current compliant function system for Technical Baseline information management. It is mostly a manual paper system. This activity can be done more efficiently and effectively using modern information management and information systems for maintaining the configuration of technical information, including the Technical Baseline, used for operating, maintaining, and conducting engineering in support of TWRS. A general overview of the information system requirements to support configuration management and document control is described below. This is a description of this modern system which is described in three categories.

5.1 WORK MANAGEMENT

To support work management, information systems will be required to enable work planners and schedulers to match job task requirements to available resources, estimate and obtain approval of costs, establish priorities, and initiate actions across the disciplines to coordinate related activities. Plant-wide access to accurate information, pertinent and specific to the work, will help ensure that the job task is done safely and efficiently. The same will also help assure that the configuration control of the waste retrieval process and its supporting infrastructure is maintained and the process plant remains within its operating envelope.

5.2 TECHNICAL BASELINE MANAGEMENT

To maintain the Technical Baseline, an integrated information system will be required that includes Technical Baseline information and documentation. It should provide a flow of traceable information that links related items, such as requirements, process definitions, drawings, technical data, and operations and maintenance procedures.

The documents and technical information that define the Technical Baseline will need to be accurate, integrated, linked, and available electronically in real-time as they are updated and released. An efficient change control process will need to be in place to maintain the fidelity of the Technical Baseline components.

Personnel will need to be able to modify the documents of the Technical Baseline, such as drawings or sets of drawings simultaneously, either independently or in a collaborative work environment with assurance that real-time information exchange will disseminate their changes globally. Linkage between a Technical Baseline component and its references will need to be available electronically as well. For example, a user should be notified when a procedure may also need to be modified due to a proposed or authorized drawing change.

The latest revision and change status to Technical Baseline documents, drawings, and data will need to be available electronically to operators and engineers at the Document Management Information Centers and at the worker's desktop.

5.3 PROCESS CONTROL

By the Year 2002 TWRS will operate a waste retrieval process plant moving waste from storage tanks to privately managed waste immobilization facilities. Operators will need to control this process using a single, fully integrated, Process Control Information System. The system will need to combine surveillance, remediation, retrieval, waste transfer monitor and control processes (which today run on at least five independent systems), and several technical information databases.

The Process Control Information System will be the information "nerve" center for the waste retrieval process. The information architecture of this system will include a supervisory monitor and control system linked to the key technical database systems. The monitor and control system will need to provide the traditional functions as well as capture the process's behavior in the form of programmed rules and process component relationships (i.e., knowledge-based). The databases will need to provide configuration control information, process parameters, technical specifications, operational procedures, and tank waste inventories. A knowledge-based monitor and control system with availability to these technical data will provide a capability to assist an operator in assessing and managing an event or warning of a trend toward a future event, rather than just reporting its occurrence.

The Process Control Information System will need to acquire field readings and laboratory data as they become available. It will report plant process information using process and instrumentation diagrams, trends, history, messages, and annunciation. The system will also need to be capable of distributing information remotely to authorized users anywhere on or off the Site via the HLAN and Internet.

6.0 PROGRAM/PROJECT LIFE-CYCLE SUPPORT DOCUMENTS

In accordance with DOE Orders 430.1, *Life Cycle Asset Management*, and 4700.1, *Project Management System*, and associated DOE Life Cycle Asset Management Good Practice Guides GPG-FM-001, *Project Management Overview;* GPG-FM-002, *Critical Design Criteria*; and GPG-FM-010, *Project Execution and Engineering Management Planning*, Engineering's interface with the program/project life-cycle effort is involved in five phases: Pre-conceptual, Conceptual, Design, Construction, and Closeout. This interface involves effort in technical, cost, and schedule baseline phases of the engineering baseline (which is part of the Technical Baseline) responsibilities. The engineering baseline documents specified in the Management Good Practice Guidelines are listed in Figure 4. The documents will be used, as appropriate, to document the Technical Baseline for projects in support of the TWRS retrieval mission.

Figure 4. Tank Waste Remediation System Technical Baseline Life-Cycle Documentation.

Program Life Cycle									
		Facilities/Engineering System							
		Project Life Cycle							
Subject Area	Program Planning	Preconceptual	Conceptual	Execution			Operations & Maintenance	Closeout	
				Design	Construction	Turnover		Post Operations	Decommissioning & Decontamination
Technical	None	■ Systems Engineering ●◆ Mission Need ●◆ Functions & Requirements ●◆ Alternative Evaluation Start ● Alternative Selections ● Preconceptual Development Plan ● Safety Assessments ◆ Functional Design Criteria Development	■◆ Conceptual Design Report ■ Thresholds ■ Systems Engineering Requirements ■ Site Location ■ Site Characterization ■ Feasibility Studies ■ Performance Indicators ● Functions and Requirements ● Continuing Alternative Evaluations ● Alternative Selections ● Design Documentation ● Interface Control Docs ● Test and Evaluation ● Specifications ● Safety Assessments ◆ Consolidated Design Criteria Document ◆ Conceptual Design Drawing and Specs	■◆ Detail Design ■ Systems Engineering ■ Thresholds ● Functions & Requirements ●◆ Trade off Studies ● Alternative Selections ● Design Documentation ● Interface Control Documentation ● Test & Evaluation ● Operations/ Maintenance Requirements Documentation ● Project Organization ● Safety Assessments ● Specifications ◆ Construction Package ◆ Preliminary Design Drawings & Specs ◆ Approval for Applicable Long-lead Procurement ◆ Definitive Design Drawings and Specs	■ Performance Indicators ■ Systems Engineering ● Functions and Requirements ● Re-evaluation of Alternatives ● Alternative Selections ● Acceptance Documentation ◆ As-built Drawings & Specifications ◆ Construction Completion Report ◆ Acceptance Testing ◆ Complete Start-up Preparations ◆ Demonstrate Capability to Meet Technical Performance Goals from Baseline	None	None	●Functions and Requirements ●Alternative Evaluations ●Alternative Selections ●Safety Assessments	

KEY
■ Derived from Good Practice Guide GPG-FM-002 (DOE Order 430.1)
● Derived from Good Practice Guide GPG-FM-010 (DOE Order 430.1)
◆ Derived from DOE Order 4700.1

7.0 REFERENCES

Acts

Resource Conservation and Recovery Act of 1976, as amended, 42 USC 6901 et seq.

Code of Federal Regulations

10 CFR 830, "Nuclear Safety Management," *Code of Federal Regulations*, as amended.

U.S. Department of Energy Orders

DOE Order 430.1, *Life Cycle Asset Management*, U.S. Department of Energy, Washington, D.C.

DOE Order 4700.1, *Project Management System*, U.S. Department of Energy, Washington, D.C.

Good Practice Guides

GPG-FM-001, *Project Management Overview*, Life Cycle Asset Management, Good Practice Guide, U.S. Department of Energy, Washington, D.C.

GPG-FM-002, *Critical Decision Criteria*, Life Cycle Asset Management, Good Practice Guide, U.S. Department of Energy, Washington, D.C.

GPG-FM-010, *Project Execution and Engineering Management Planning*, Life Cycle Asset Management, Good Practice Guide, U.S. Department of Energy, Washington, D.C.

Documents

LMHC, 1997, *TWRS Administration*, HNF-IP-0842, Fluor Daniel Hanford, Inc., Richland, Washington.

Peck, L. G., 1998, *Tank Waste Remediation System Systems Engineering Management Plan*, HNF-SD-WM-SEMP-002, Rev. 1, prepared by Lockheed Martin Hanford Corporation for Fluor Daniel Hanford, Inc., Richland, Washington.

Vann, J. M., E. R. Hamm, and R. D. Crisp, 1998, *Tank Waste Remediation System Configuration Management Plan*, HNF-1900, Rev. 0, prepared by Lockheed Martin Hanford Corporation for Fluor Daniel Hanford, Inc., Richland, Washington.

APPENDIX A

GUIDANCE AND REQUIREMENTS TO DELIVERABLES CROSSWALK

Tank Waste Remediation System Engineering Plan

Table A-1. Guidance and Requirements to Deliverables Crosswalk - TWRS Engineering Plan.

Guidance or Requirement	Status	Implementing Requirement
A.1 DOE Letter to H. J. Hatch, FDH, from W. J. Taylor, DOE, dated August 8, 1997, #9757162A (36 ITEM CHECKLIST)	.	
19. The physical integrity of existing systems, structures, and components has been verified.	I	Section 2.3, 2nd paragraph
A.3 DOE Letter H. J. Hatch, FDH, from William J. Taylor, DOE, dated December 2, 1997, #9761291	.	
5. Provide specific information to address the ten areas in Paragraph 4.2.4 of the August 8 DOE letter of direction	.	
j. Deliver to DOE or make available for DOE review, Draft Program Plans	I	The plan will be provided to DOE upon request
B.1 DOE Order 430.1, "Good Practice Guide," GPG-FM-002	.	
5. Contingency Management	I	Project contingency funds are allocated through a formal change process
5. Contingency Management	I	Project contingency funds are allocated through a formal change process
C.1 Interface Control Documents	.	
21. Waste Feed Tanks	.	
3. Provide necessary as-built design information on waste feed tank and auxiliary systems.	I	Section 2.3 , 1st paragraph
D.1 Detailed Instructions for Assessment of RTP - Appendix C, November 14, 1997	.	
13. Discuss the likelihood that projects will require revalidation based on changes in requirements created by private contractor's ICDs/deliverables.	I	Section 2.1
22. Identify any safety-related documents behind schedule and impact of failure.	I	Section 2.1
D.3 Plan for Determining PHMC-Team's RTP for Waste Feed Delivery - Document Checklist (Table 3)	.	
35. Plans conclude that two-300-HP mixers will be sufficient to mobilize sludge in each DST.	I	The design process as described in the plan will determine if the 300-HP mixers are adequate
36. Plans provide that a surface barrier design provided by ER will be adequate for closure.	I	Phase 1B will determine the type of barrier design required for closure

Table A-1. Guidance and Requirements to Deliverables Crosswalk - TWRS Engineering Plan.

Guidance or Requirement	Status	Implementing Requirement
53. Plans define equipment requirements, infrastructure requirements, and recommend a preferred alternative consistent with DOE guidance.	I	Section 2.1 defines the requirements for function and requirements; Document section 2.4 defines the requirements for the performance of alternative analysis and the issuance of concept and design reports to document the preferred alternative
58. Plans describe reassessing the timing and needs for procurement of additional mixer pumps for DSTs, considering the need dates and availability of advanced mixer-pump designs.	I	Section 2.2
61. Plans include completion of SST Retrieval Sys CDR, including sys def, leak detection mitigation and monitoring as required per TPA.	I	Section 2.4; however, this section defines the requirement of issuance of a CDR, but it does not state specific requirements such as leak detector requirements
65. Plans include completing design activities and safety studies to support installation of the mixer pumps in AP-102, 104 and 105 and determine the needs for all tanks identified in the Phase 1 feed.	I	Section 2.4, however, as stated above, it does not state specific requirements
D.6 Draft Plan for Determining RTP for Infrastructure & Byproducts Delivery, Appendix A, Technical Baseline Checklist.		
16. Show that the Master Blueprint and Engineering studies and Alternative Generation Analyses (AGAs) are complete.(4.1.1-4.1.3)	I	Section 2.4, 1st paragraph
19. Show that space has been provided for temporary facilities when needed. (4.1.9 and 4.1.10)	I	Section 2.4, 2nd paragraph
20. Show infrastructure design meets seismic and wind-loading requirements. (4.1.10 and 4.1.11)	I	Section 2.1 and Section 2.4
D.8 Draft Plan for Determining RTP for Infrastructure & Byproducts Delivery, Appendix C, Infrastructure (Management Baseline) Checklist.		
43. Confirm D&D is considered during design. (1.2.8)	I	Section 2.4, 1st paragraph
D.9 Draft Plan for Determining RTP for Infrastructure & Byproducts Delivery, Appendix D, Feed Tank/Air Emissions (Technical Baseline Checklist).		
60. Show that the Master Blueprint and Engineering studies and Alternative Generation Analyses (AGAs) are complete.(4.1.1-4.1.3)	I	Section 2.4, 1st paragraph

Table A-1. Guidance and Requirements to Deliverables Crosswalk - TWRS Engineering Plan.

Guidance or Requirement	Status	Implementing Requirement
63. Show that space has been provided for temporary facilities when needed. (4.1.9 and 4.1.10)	I	Section 2.4, 1st paragraph
64. Show infrastructure design meets seismic and wind-loading requirements. (4.1.10 and 4.1.11)	I	Section 2.1 and Section 2.4
87. Confirm D&D is considered during design. (1.2.8)	I	Section 2.4, 1st paragraph
E.1 TWRS Waste Disposal Division Planning Guidance dated July 7, 1997 (Updated December 12, 1997)		
Complete design activities and safety studies to support the installation of mixer pumps in AP-102, AP-104 and AN-105.	I	Section 2.4, but not specific
IHLW Storage will update the statement of work to prepare conceptual design for IHLW storage facilities and issue for review a conceptual design and preliminary safety evaluation.	I	Section 2.4
Retrieval will follow the special MYWP requirements outlined in paragraph 4.2.	I	Entire Document. Projects will comply.

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