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Page 1 of 1

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RPP-6029
Revision 0

244-CR Vault Interim Stabilization Project Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

CH2MHILL
Hanford Group, Inc.
Richland, Washington

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC06-99RL14047

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244-CR Vault Interim Stabilization Project Plan

D. Parkman
CH2M HILL Hanford Group, Inc., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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RPP-6029
Revision 0

244-CR Vault Interim Stabilization Project Plan

Prepared by:
Numatec Hanford Corporation
Richland, Washington

TRW Environmental Systems
Richland, Washington

Fluor Federal Services
Richland, Washington

Parsons Infrastructure & Technology Group
Richland, Washington

Date Published
April 2000

CH2MHILL
Hanford Group, Inc.

P. O. Box 1500
Richland, Washington

Contractor for the U.S. Department of Energy
Office of River Protection under Contract DE-AC06-99RL14047

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EXECUTIVE SUMMARY

The 244-CR Vault Facility is an underground concrete structure housing four waste processing tanks, each in a below grade concrete cell. The facility was originally constructed in 1952 to support the uranium metal recovery program that ended in 1973. It served as a lag storage and transfer station for various waste streams including PUREX acidified sludge and in the 1960s for fission product "crudes" between PUREX and B Plant. The most recent use of the facility was in support of the Interim Stabilization Project, as a double-contained receiver tank (DCRT) facility in the removal of liquid from the single-shell tanks in C Farm. The most recent transfers for that function occurred in 1995 using tank CR-003.

The 244-CR Vault Facility contains an estimated 173,740 L (45,900 gal) of liquid and waste. Of the total volume, 160,870 L (42,500 gal) is contained in the four waste process tanks, and an estimated 12,870 L (3,400 gal) is contained in the concrete cells housing the tanks.

Waste level instrumentation for the vault facility is operational only on tank CR-003. Because of this limitation, tank volumes were taken from historical records that also are reflected in the current final safety analysis report (FSAR). Liquid is known from a video taken in 1997 to be present in sump 3. The liquid in sump 3 appears to be water and is assumed to be leakage from precipitation and snowmelt that leaked around the cover blocks before installation of foam seals on the pit covers. It is assumed that the other cells also have acquired some liquids from precipitation and snowmelt leakage around the cover blocks before they were sealed.

By design, ancillary facility components drain liquids from condensation, process leaks, or intrusion from precipitation and snowfall to the 244-CR vault sumps and tanks.

In November 1999, the "interim stabilization" of the 244-CR Vault Facility was defined as a stretch goal in FY 2000 Performance Incentive (PI) ORP 3.3.1. Although not one of the TPA milestones, the requirements were defined in TPA Change Control Form M-45-99-02. This TPA change was created to move the 244-AR Vault Facility from the Hanford Federal Facility Agreement and Consent Order (TPA) Milestone M-32-00, Complete Identified Dangerous Waste Tank Corrective Actions," to Milestone M-45-00, "Complete Closure of all Single-Shell Tanks." The PI requires submittal of the 244-CR Vault Interim Stabilization Project Plan by April 28, 2000.

This project plan provides a path forward for the interim stabilization of the 244-CR vault to meet the requirements set forth in PI ORP3.3.1. Following the evaluation of alternatives, this plan outlines the design and installation of a "temporary transfer system" into the 244-CR Vault Facility for removal of the pumpable liquids contained in the process tanks and sumps. Because of previous clean up in the C Farm, many of the services originally in place at the facility have been removed or are no longer functional. This plan requires minimal reliance on the existing equipment in the 244-CR Vault Facility and does not require the lifting of the cover blocks over the pump pits. The temporary system will consist of an aboveground flexible jumper for transfer of the liquid from a series of pump legs that will be lowered into the respective tanks and sumps. Access to the tanks and cells will be achieved through piping penetrations in the floor of the riser pits.

In parallel to the pumping effort, the facility will be isolated from process liquid lines and waste transfer lines, and the intrusion paths will be mechanically blocked to prevent further intrusion of liquids into the 244-CR vault.

Scope

The scope of the project is for the "interim stabilization" of the 244-CR Vault Facility as defined in PI ORP 3.3.1. The interim stabilization activities include the following requirements:

1. Removal of pumpable liquids from the 244-CR vault tanks
2. Removal of pumpable liquids from the 244-CR vault sumps
3. Isolation of the 244-CR vault
4. Provisions for the removal of liquids which may accumulate in the future
5. Installation of intrusion prevention mechanisms as necessary
6. Establishment of liquid-level monitoring to detect future intrusions.

A requirements matrix for these activities is provided in Appendix A.

Schedule

The schedule logic for the interim stabilization of the 244-CR Vault Facility has been developed in this plan on the assumption of an October 1, 2000, start date as shown in Figure 6-2. The project duration is 2.5 months. The actual start date for the project will be established on approval of funding.

Cost

The estimate to provide interim stabilization of the 244-CR Vault Facility is $4,123,200. Pending funding authorization, assuming an October 1, 2000 start date, the FY funding estimate is as follows:

	FY 2001	**FY 2002**	**FY 2003**	**Total**
Total Escalated Cost ($000)	$2945.6	$1177.6	$0.0	$4123.2

A detailed cost breakdown is provided in Section 6.5.

The project, when completed, will result in the interim stabilization of the 244-CR Vault Facility. The submittal of the project plan will complete the stretch goal PI ORP3.3.1.

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TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

TERMS

AB	authorization basis
ABU	acceptance for beneficial use
ALARA	as low as reasonably achievable
ALARACT	as low as reasonably achievable control technology
ATP	acceptance test plan/procedure
AWA	advance work authorization
BCR	baseline change request
CAM	continuous air monitor
CASS	Computer-Automated Surveillance System
CAA	*Clean Air Act*
CEIS	cost estimating input sheet
CFR	*Code of Federal Regulations*
CHG	CH2M HILL Hanford Group
DACS	Data Acquisition and Control System
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy Headquarters
DST	double-shell tank
Ecology	Washington State Department of Ecology (WDOE)
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESQ&H	environmental, safety, health, and quality assurance
FH/FHI	Fluor Hanford, Inc.
FSAR	final safety analysis report
FTE	full-time equivalent
FY	fiscal year
GMS	Gas-Monitoring System
HAZOP	hazard and operability study
HDW	Hanford Defined Waste
HPT	health physics technician
IS	interim stabilization
ISMS	Integrated Safety Management System
LFL	lower flammability limit
LMHC	Lockheed Martin Hanford Corporation
MYWP	multi-year work plan
NEPA	*National Environmental Policy Act of 1969*
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOC	notice of construction
NS&L	Nuclear Safety and Licensing
ORP	Office of River Protection
ORR	operational readiness review
OTP	operational test procedure
P3	Primavera Project Planner, a proprietary scheduling software owned by Primavera Systems, Inc.
PI	performance incentive

PBS	project baseline summary
PHMC	Project Hanford Management Contract
PNNL	Pacific Northwest National Laboratory
RA	readiness assessment
RCRA	*Resource Conservation and Recovery Act of 1976*
RPP	River Protection Project
RL	U.S. Department of Energy, Richland Operations Office
SA	safety assessment
SEPA	*State Environmental Policy Act*
SER	safety evaluation report
SHMS	Standard Hydrogen Monitoring System
SST	single-shell tank
TBR	technical basis review
TFFO	Tank Farm Facilities Operations
TMACS	Tank Monitor and Control System
TRU	transuranic (waste)
TSR	technical safety requirement
TWO	Tank Waste Operations
TWRS	Tank Waste Remediation System
USQ	unreviewed safety question
WAC	*Washington Administrative Code*
WBS	work breakdown structure
Ecology	Washington State Department of Ecology
WDOH	Washington State Department of Health

1.0 INTRODUCTION

1.1 BACKGROUND

The 244-CR Vault is a two-level, multi-cell structure of reinforced concrete constructed below grade. The lower cell contains four individual compartments, each containing a steel process storage tank and equipped with a concrete sump. The upper cell contains the piping and support equipment, and has two compartments for each of the tanks. The "pump pit" is accessed by the removal of concrete cover blocks, while the smaller "riser pit" is accessed by steel cover plates. The facility most recently was used as a double-contained receiver tank (DCRT). A DCRT is a type of waste transfer tank that together with its related equipment constitutes a short-term storage area for liquid waste and has a pump pit for waste transfer operations. This vault most recently was used for short-term storage and waste routing for saltwell liquid pumped from the 241-C Tank Farm in the 200 East Area. Waste transfer lines are connected inside the pump pit by a jumper installed between connecting nozzles.

An active ventilation system is in operation at the 244-CR vault. Ventilation supply air enters the upper vault section through an inlet header with some leakage through the spaces between the cell cover blocks. The upper and lower vaults are connected by exhauster ports, which allow airflow between the two sections. Normal flow moves air from the upper cell to the lower cell where it is removed and routed into a filter plenum; there the air is treated by a bank of four prefilters and two banks of high-efficiency particulate air (HEPA) filters (each containing four HEPAs). The air is exhausted to the atmosphere through the 296-C-05 Stack. The stack is equipped with a record sampler and continuous air monitor. Two fans (each rated at 4,200 cubic feet per minute) installed downstream of the filtration system provide the motive force for exhausting the vaults and the tanks. As an active system, it is operated continuously with only one of the two fans required to operate at a time. A continuous beta-gamma air monitor is interlocked to the operating fan. Loss of power to the fans will activate an alarm at the 244-AR facility.

1.2 PERFORMANCE INCENTIVE ORP 3.3.1 DELIVERABLES

The U.S. Department of Energy (DOE) Office of River Protection Program (ORP) has established a Performance Incentive (PI) ORP 3.3.1 with CH2M HILL Hanford Group, Inc. (CHG), for the fiscal year (FY) 2000. The PI requires the submittal of a project plan for the stabilization of the 244-CR Vault by April 28, 2000.

The PI contains four requirements for the satisfactory completion of the 244-CR Project Plan:

1. Address the six items listed in Change Control Form M-45-99-02 of the *Hanford Federal Facility and Consent Order* (Ecology et al. 1996), also known as the Tri-Party Agreement (TPA).

2. Describe the scope of work necessary to stabilize the vault(s) until the facility(s) may be turned over for final disposition and closure.

3. Provide a cost estimate for performing the scope of work
4. Provide a schedule for completing the work.

A copy of the PI is included as Figure 1-1.

Although 244-CR is not included in the TPA milestone, requirement #1 is defined further in TPA Milestone M-45-11A as contained in TPA Change Control Form M-45-99-02, which defines the six activities required for interim stabilization. Those six items are listed below:

1. The removal of pumpable liquids from the 244-CR vault tanks
2. The removal of pumpable liquids from the vault itself and its associated sumps
3. Isolation of the 244-CR vault
4. Provisions for the removal of pumpable liquids that may accumulate in the future
5. Installation of intrusion prevention mechanisms as may be necessary
6. Establishment of periodic liquid level monitoring systems for the detection of accumulating liquids before final closure.

1.3 OVERALL PLANNING APPROACH AND THE FOCUSED TASK TEAM

A focused task team was established to develop, evaluate, and document a plan to stabilize the 244-CR Vault Facility. The 244-CR Interim Stabilization Team used a systems engineering, logic-based planning approach. Members of the task team were chosen to represent the major functions within the River Protection Project (RPP), including Operations; Maintenance; Nuclear Safety & Licensing; Environmental, Safety, Health, and Quality; Engineering; and Process Engineering, as well as support staff. A requirements matrix (see Appendix A) defines the goals and deliverables expected in the stabilization of the 244-CR vault. Measures of success for the planning phase of the work, supporting PI ORP 3.3.1, are listed in Table 2-4. The management approach to the project is discussed in Appendix B. A logic network (see Appendix C) was prepared to focus the efforts in a disciplined project approach for planning, scheduling, and costing of activities. Additional details of the project organization appear in Section 7.0.

Figure 1-1. Office of River Protection Performance Incentive ORP 3.3.1. (2 sheets)

Office of River Protection

Performance Incentive Number ORP3.3.1
Revision No. 1 Date: 3/15/00

FY 2000 PERFORMANCE INCENTIVE

SECTION 1
General Information

Descriptive Short Title: Vault Stabilization

Project Baseline Summary (PBS): TW03

Maximum Available Incentive Fee: $250,000

Type: X Standard X Stretch

SECTION 2
Technical Contacts

ORP Point of Contact: Ami Sidpara

Contractor Point of Contact: Dale Allen

SECTION 3
Performance Expectations and Earning Schedule

GENERAL REQUIREMENTS: In order to earn incentive fee under this Performance Incentive, the Contractor shall:

1. Meet the specific completion criteria and expectations set forth in this Performance Incentive; and

2. Not incur any unfavorable cost variance [(BCWP-ACWP)/BCWP] less than -5.0 percent, or incur any unfavorable schedule variance [(BCWP-BCWS/BCWS] less than -7.5 percent, measured at the Project Baseline Summary level identified in Section 1, at the end of FY 2000.

STANDARD (70%)
Provide a project plan (by March 30, 2000) for stabilizing 244-AR Vault.

STRETCH (30%)
Provide a project plan for stabilizing 244-CR Vault by April 28, 2000. The standard expectation must be met to earn this fee.

NEGATIVE (70%)
Fail to provide a project plan (by April 28, 2000) for stabilizing 244-AR Vault.

SECTION 4
Performance Requirements

DEFINE COMPLETION: *(Specify Performance Elements and describe indicators of success (quality/progress). Include baseline documentation/data against which completion documentation should be compared.)*

The project plan shall:
(1) Address the six items listed in TPA Milestone M-45-11A.
(2) Describe the scope of work necessary to stabilize the vault(s) until the facility(s) may be turned over for final disposition and closure.
(3) Provide a cost estimate for performing the scope of work.
(4) Provide a schedule for completing the work.

DEFINITIONS: (define terms)

COMPLETION DOCUMENTS LIST: *(Name the Documents, Databases, etc., which will be submitted to show completion for each Performance Expectation.)*

The Project Plan

Page 1 of 2

Contract Number DE-AC06-99RL14047

Figure 1-1. Office of River Protection Performance Incentive ORP 3.3.1. (2 sheets)

Office of River Protection

Performance Incentive Number ORP3.3.1
Revision No. 1 Date: 3/15/00

FY 2000 PERFORMANCE INCENTIVE

ASSUMPTIONS/TECHNICAL BOUNDARY CONDITIONS: ***(For reasonably foreseeable impacts to performance that are not within control of Contractor. If the assumption or condition proves false, the remedy is renegotiations unless stated otherwise.)***

SECTION 5
Signatures

3/24/00	Dale E Allen 3-24-00
Manager, ORP/Date	President and General Manager, CHG/Date
3/24/00	J.M. Batten 3-24-00
ORP Contracting Officer/Date	CHG Contract Representative/Date

2.0 MISSION ANALYSIS

The primary mission of the 244-CR Vault Interim Stabilization Project is to remove any remaining pumpable liquids from the four sumps and the four tanks located within the belowgrade vault facility. Additional steps will be taken as part of the plan to isolate the facility, prevent further intrusions of precipitation or snowmelt, provide periodic monitoring to detect any future intrusion, and retain the ability to pump accumulated liquids in the future if it is necessary. The work will be planned in FY 2000 with submittal of the project plan to ORP by April 28, 2000. The stabilization work will be integrated into the Tank Waste Operations schedule on receipt of funding authorization.

This section addresses the evaluation of the 244-CR vault project mission. It reviews the problem, the options for stabilization, and the path forward. It also establishes the project boundaries and interfaces, addresses the current conditions of the facility, and projects the conditions at completion of stabilization. The mission life cycle is reviewed in this section, which also looks at mission-level requirements, objectives, measures of success, and path forward. A more detailed description of the path forward appears in Sections 3.0, "Technical Strategy," 4.0, "Project Strategy," and 6.0, "Project Baseline."

2.1 PROBLEM STATEMENT

Liquid waste remains in the 244-CR Vault Facility though future use of the facility has not been identified. The majority of this waste is contained in the process tanks, with some liquid known to be present in the process cell sumps. The current volume estimates for the liquid levels in the tanks and sumps of the facility are shown in Figure 2-1. The volumes are estimated since there is only operational monitoring in tank CR-003. Although it is anticipated that a portion of the total liquids present is water from precipitation or snowmelt that has leaked into the facility over the years, some process waste is still contained within the tanks. PI ORP 3.3.1 requires that pumpable liquids be removed and the facility be isolated and that steps be taken to prevent intrusions from future precipitation and snowmelt. Also required is that the stabilized facility be monitored and provision be made for the removal of liquid from the facility should further intrusion occur.

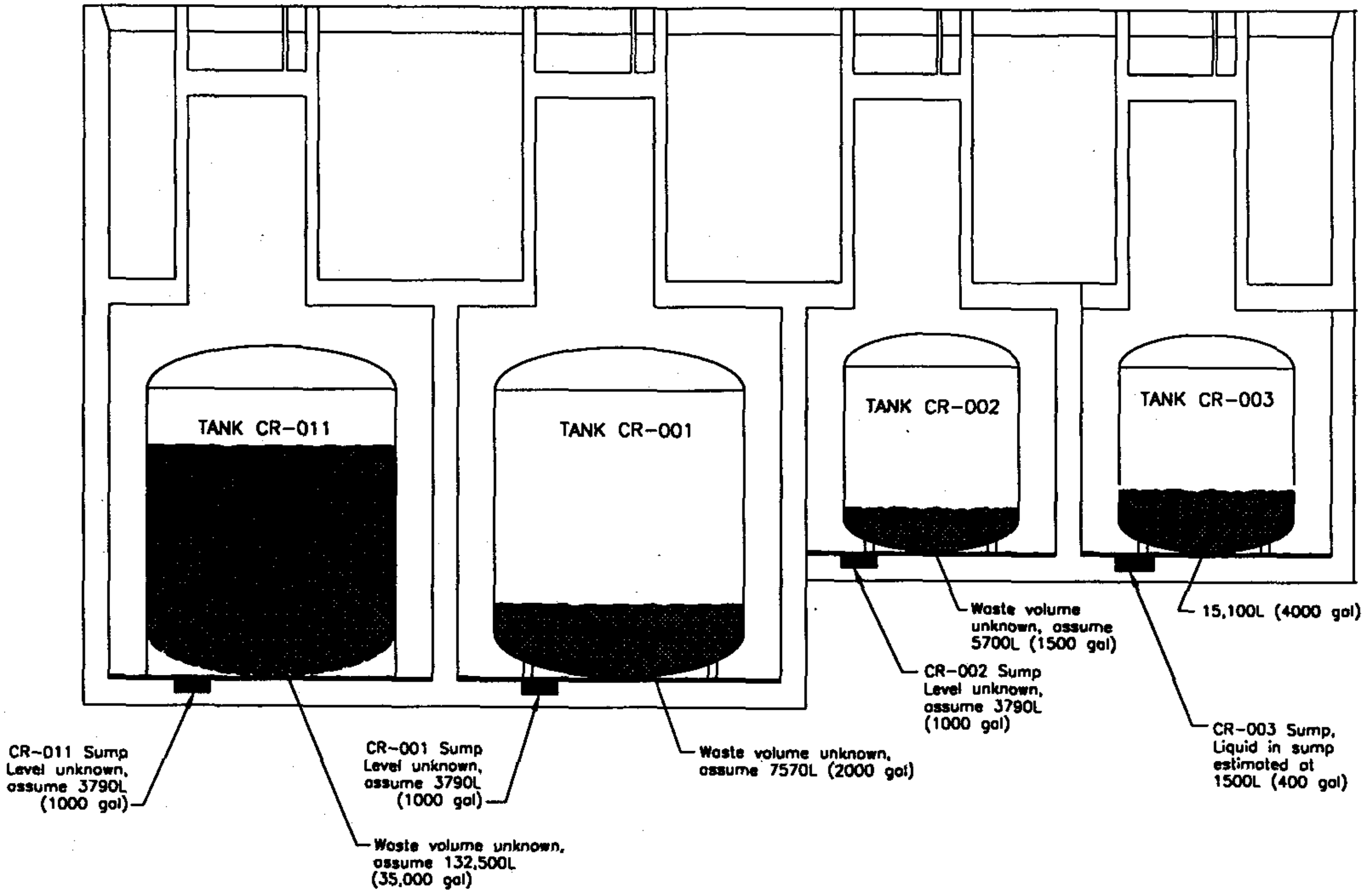


Figure 2-1. Current 244-CR Vault Tank and Sump Liquid Levels.

2.2 PROJECT OBJECTIVE

The objective of the 244-CR Vault Interim Stabilization Project is to remove the pumpable liquids from the facility and prevent any future accumulation of liquids in the 244-CR vault tanks or sumps. The goal is to remove the liquids in a safe, efficient and timely manner that would not affect the subsequent deactivation of the facility.

2.3 PROJECT TIMING

The FY 00 PI ORP 3.3.1 requires submittal of the project plan for the interim stabilization of the 244-CR Vault Facility to ORP by April 28, 2000. This document serves to meet that deliverable. Because the physical work is not scheduled for this fiscal year and is not yet funded, the actual project start date has not been determined. For the purpose of cost estimating and schedule logic, the plan has been modeled with a start date of October 1, 2000. This project plan describes the scope, schedule, and cost of the proposed work. The project will be added to the integrated RPP schedule when funding is authorized. Project activity interferences for both workspaces and the availability of resources must be evaluated at the time when the project is funded and added to the RPP schedule.

2.4 PROJECT BOUNDARIES AND INTERFACES

Figure 2-2 shows the 244-CR vault stabilization activity boundaries and interfaces for removal of pumpable liquids and facility isolation. The main block in the center of the figure lists the initial status and the desired end status for the facility, along with the internal interfaces. Other interfaces are shown outside the large block. The following sections describe the external and programmatic interfaces, as well as the physical, internal, and other RPP Project interfaces depicted in the figure.

2.4.1 External Interfaces

- Washington State Department of Ecology (Ecology). Ecology has regulatory authority over all facilities storing dangerous waste under the *Resource Conservation and Recovery Act of 1976* (RCRA). Operational changes that affect the RCRA permit conditions must be approved by Ecology. Additionally, Ecology has regulatory authority over non-radioactive air emissions.

- Washington State Department of Health (WDOH). WDOH has regulatory authority over radioactive air emissions from all facilities.

- U.S. Environmental Protection Agency (EPA). EPA has federal authority over radioactive air emissions.

2.4.2 Programmatic Interfaces

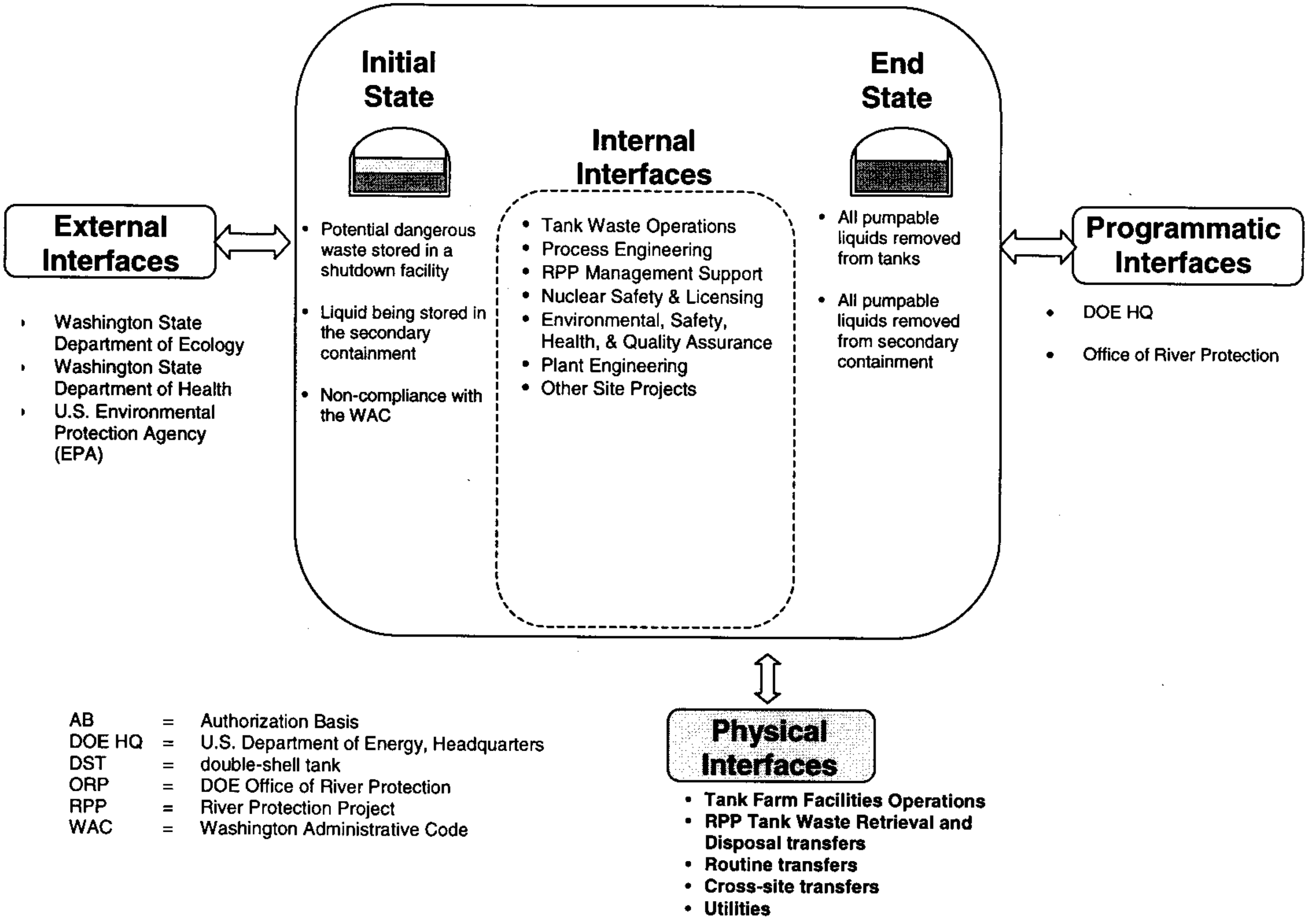
- U.S. Department of Energy Headquarters (DOE-HQ). DOE-HQ provides funding and overall direction to ORP.
- U.S. Department of Energy Office of River Protection (ORP). The ORP manages all activity within the RPP.

2.4.3 Potential Effects on Other River Protection Project Programs

Conflicts with other new or ongoing RPP projects will be reviewed when the 244-CR Interim Stabilization Project is funded and scheduled. One of the known potentials for schedule interference is the use of the cross-site transfer line. Tank Waste Operations maintains a transfer system configuration to support the routine use of the cross-site transfer system, which is currently scheduled for operation two or three times a year. The transfer configuration required to transfer liquids from 244-CR to a DST would prevent a concurrent cross-site transfer. Scheduling should support the reconfiguration of the system for the period of time required to pump the 244-CR liquids to a DST and reestablish the cross-site configuration between the scheduled cross-site transfers.

All of the pre-transfer activities can be completed independently of tank farm programs. Although competing DST resources will have to be scheduled to avoid conflicts, no negative effects are anticipated.

Figure 2-2. 244-CR Canyon Stabilization Activity Boundaries and Interfaces.



AB	=	Authorization Basis
DOE HQ	=	U.S. Department of Energy, Headquarters
DST	=	double-shell tank
ORP	=	DOE Office of River Protection
RPP	=	River Protection Project
WAC	=	Washington Administrative Code

2.4.4 Facility Boundaries

- The 244-CR Vault/Facility includes the 244-CR vault and tanks contained within the facility boundary as shown in Figure 2-3.

2.4.5 Physical Interfaces

- Tank Farms Facility Operations (TFFO). The management of tank waste includes operation, surveillance and maintenance of the tanks, facilities, and associated infrastructure. The stabilization activities will modify the 244-CR Facility and use the DST transfer system for liquid removal. Close coordination of all work supporting the stabilization activities and TFFO will be required. Liquid transfers from the 244-CR Facility will not change the basic chemical composition of the waste in the receiving DST.

- RPP Tank Waste Retrieval and Disposal Transfers. To reduce the potential for additional contamination of the environment, ORP plans to transfer the waste from the single-shell tanks (SST) to the DST system and then transfer the waste to privately owned and operated waste immobilization facilities. This approach is referred to as RPP Tank Waste Retrieval and Disposal. The 244-CR interim stabilization activities will not result in any significant adverse effects on the final retrieval of waste from the DSTs.

- Transfers. The 244-CR interim stabilization activities will use a temporary transfer system to move waste between the tanks and sumps within the vault and the tank CR-003 transfer pump to remove the pumpable liquid from the facility. The already installed jumper will carry the liquid through a double-encased line to diversion box 241-ER-153 and into the DST Transfer System. This tie-in and subsequent liquid transfer will be scheduled so that it does not interfere with routine DST Transfers.

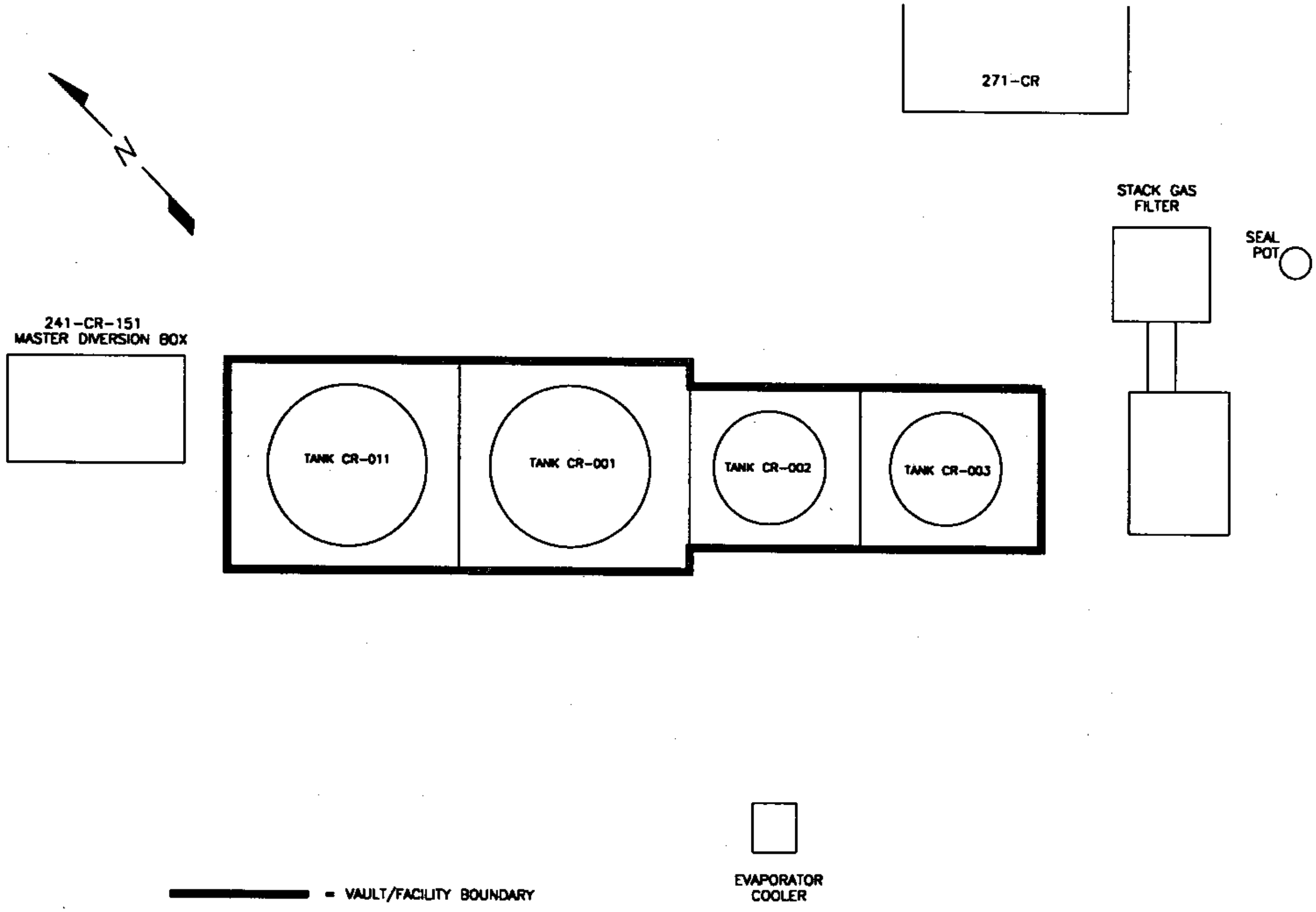
- Utilities. Utilities include the electrical power required to operate transfer pumps, ventilation, lighting, and instrumentation, as well as water for flushing and compressed air for transfer line purge. The 244-CR interim stabilization activities will need to coordinate any utility upgrades with TFFO. The flush water will be supplied by a portable tanker, as the facility water supply is isolated.

2.4.6 Internal Interfaces

- Nuclear Safety and Licensing (NS&L). The NS&L organization is responsible for the preparation and maintenance of RPP nuclear safety authorization basis (AB) documentation. NS&L also has the responsibility for resolving the formal safety issues. NS&L is responsible for developing the licensing strategy and AB modification to allow the stabilization activities to proceed.

- Plant Engineering. The Plant Engineering organization is responsible for designing the transfer system and providing test acceptance criteria.

Figure 2-3. 244-CR Vault/Facility Boundary.



- Tank Waste Operations (TWO). The TWO group is responsible for carrying out the day-to-day operational activities, maintenance, and surveillance monitoring of the RPP tank farm system. Routine tank farm surveillances are performed to existing procedures. The TWO manages all tank waste, including the liquid stored in the 244-CR Facility. It will ensure that the DST transfer system remains in operating order and will maintain 244-CR surveillance during the stabilization activities. On concluding the stabilization activities, TWO will retain responsibility for the monitoring of 244-CR until turnover.

- RPP Environmental, Safety, Health, and Quality Assurance (ESH&Q). The RPP ESH&Q organization is responsible for ensuring that proper permits and notices of construction (NOC) are written and transmitted through the ORP to the proper state and regulatory agencies. The organization is also responsible for informing the 244-CR interim stabilization project management well in advance of startup of any permit conditions that must be incorporated into their procedures. It also will review, as necessary, planned work evolutions and provide any required job-specific safety and quality assurance plans.

- RPP Management. RPP management is responsible for establishing priorities and providing management direction and oversight to 244-CR interim stabilization.

- Process Engineering. The Process Engineering organization is responsible for determining liquid composition and assessing waste compatibility as necessary to ensure that the basic chemical composition of the waste meets the DST criteria.

2.4.7 Other Site Projects

Several construction projects may be scheduled in the tank farms during the time scheduled for 244-CR interim stabilization. Because the start date for 244-CR interim stabilization has not yet been set, those interfaces have not been reviewed. Although the project plan does not anticipate specific tank farm interfaces, competition for resources and equipment needs to be coordinated once the project start date is identified.

2.4.8 Inputs and Outputs

Before liquid is removed from the facility, the 244-CR stabilization activities will sample, analyze, and stage the pumpable liquid from the sumps and tanks into tank CR-003. The tank will be pH adjusted, if necessary, to meet DST acceptance criteria. The liquid then will be transferred from the 244-CR Facility to a DST. With the volume estimated at 173,740 L (45,900 gal), the consolidating and pumping will be performed in four campaigns.

The stabilization activity requires the following:

- Electrical power
- Temporary water supply
- Liquid level indication

- pH adjustment chemicals
- Compressed air.

Stabilization activities will produce the following:

- pH-adjusted pumpable liquid transferred to a DST
- Small volumes of solid waste
- Documentation on physical and health physics conditions inside the facility.

2.5 BEGINNING STATES AND ENDING STATES

Process operations for the PUREX and BPlant missions ended in the early 1970s', use for Interim Stabilization during the pumping from the C-Farm tanks continued to approximately 1995. Much of the aboveground equipment and many services were removed in the 1990s as part of the Clean and Stable effort, although the ventilation of the facility remains active.

2.5.1 Facility Configuration

The 244-CR Vault is located near the southwest corner of CFarm complex in the 200 East Area. It is a two-level, multi-cell reinforced concrete structure built below grade, with 0.61m (2-ft) thick dividing walls and cover blocks. The upper level contains piping and equipment used for vault operation; the lower level contains the process tanks and associated sumps. The facility contains four process tanks: one 151,400 L (40,000 gal) carbon steel tank (CR-001), one 151,400 L (40,000 gal) stainless steel tank (CR-011), and two 56,775 L (15,000 gal) stainless steel tanks (CR-002 and CR-003). Each tank is housed in a separate concrete cell which has a sump designed to collect any leakage from tank operation or accumulation of rainwater/snowmelt that has leaked past the cover blocks. The general configuration of the facility is shown in Figures 2-4 and 2-5.

The rail-mounted crane used to remove the cover blocks, manipulate the piping jumpers, and change out equipment has been removed. Any lifts will require the use of a portable crane.

The vault is actively ventilated by operation of the 291-CR exhaust system. Two exhaust fans (one operating and one on standby) draw air from the process tanks and cells and exhaust it through the stack. Supply air enters a 0.75 m (30-in.) diameter inlet header and travels via sub-headers to the pump pits and cells containing the process tanks. Exhaust air from the pump pits, cells, and tanks exits through a double bank of HEPA filters.

Air flows from the upper level to the lower levels and is removed from near the floor of the lower level. There is not a dedicated vessel ventilation system for the tanks. Air exits the tanks through tank exhaust ports and is swept away by the ventilation system airflow.

Figure 2-4. 244-CR Construction (General Layout).

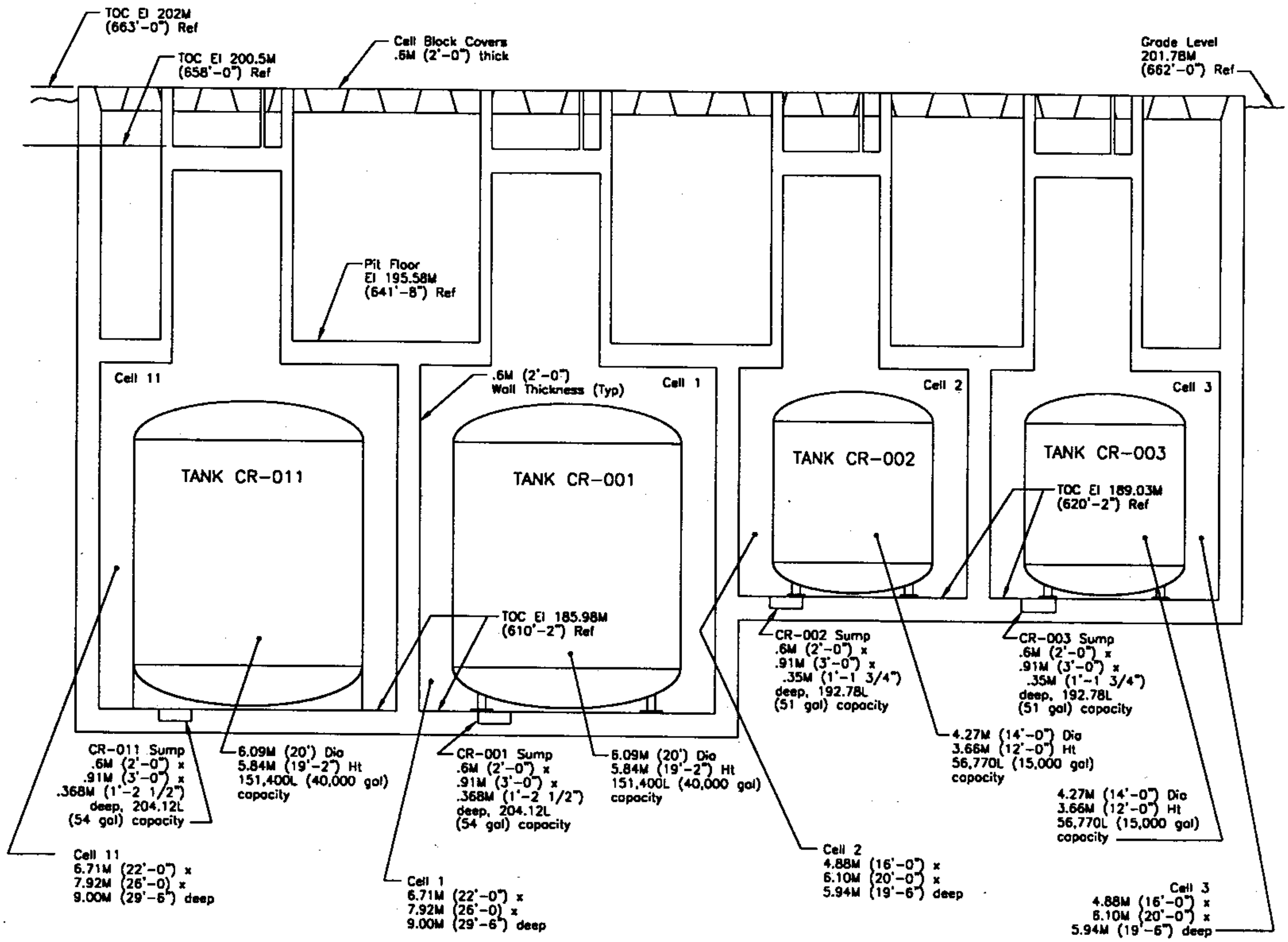
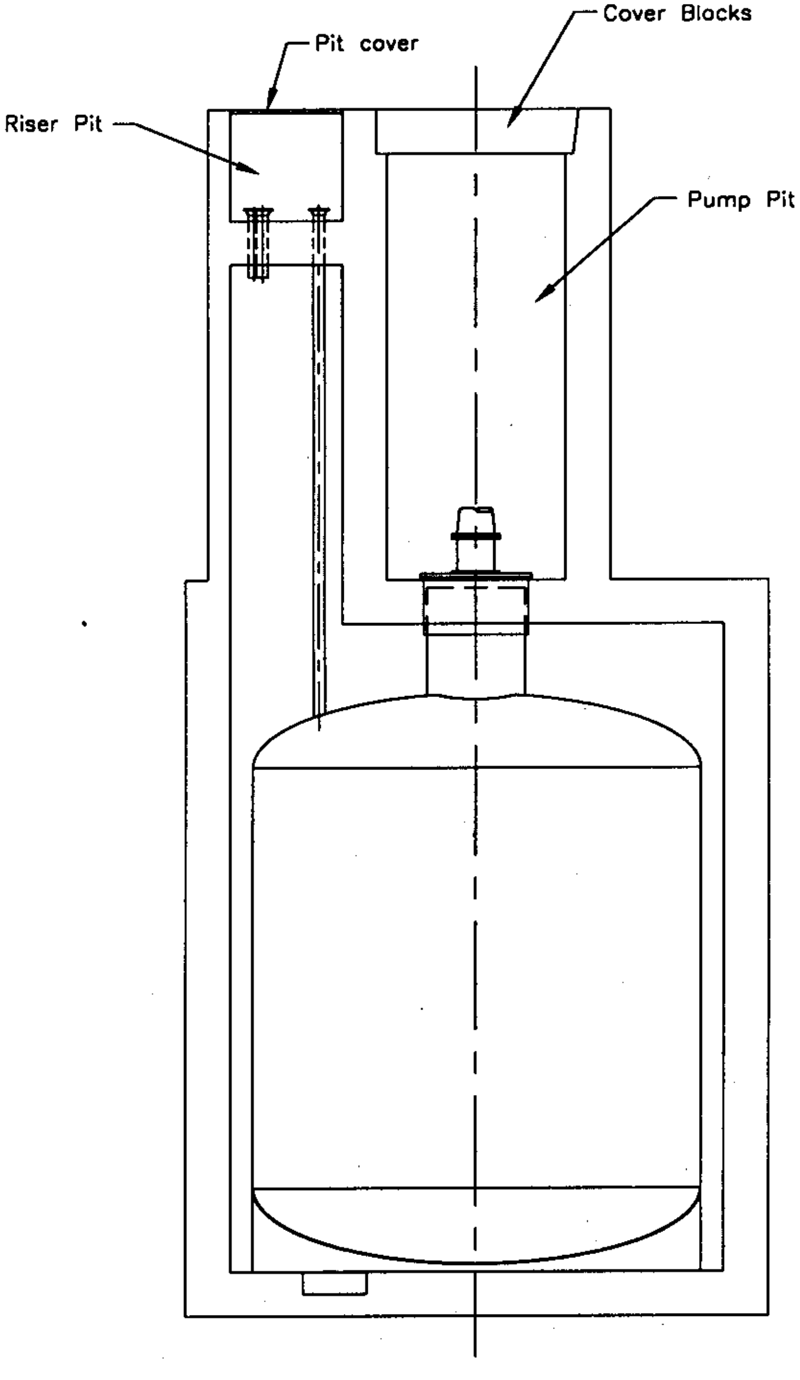


Figure 2-5. 244-CR Construction (General Layout).



Because the majority of the aboveground services for 244-CR were removed as part of the "Clean and Stable" effort during the mid-1990s, few services remain available at the vault location. Power is available through a control station above cell 3 but is not anticipated to be adequate for the project needs. The only level detection operational at the facility is a manual tape for tank CR-003. The steam lines to the facility have been removed and the water supply is locked and tagged out at the control room. Instrument air is also out of service.

2.5.2 Current Tank/Sump Liquid Conditions

Available information regarding the quantity and characteristics of the liquids in the tanks and sumps was reviewed and is summarized in the following four sections. Table 2-1 summarizes the estimated quantities of waste for the tanks and sumps.

Table 2-1. Estimated Volumes of Waste in the 244-CR Vault.

Tank / Sump	Volume (gal)
CR-001	7570 L (2000 gal)
Sump #1	3790 L (1000 gal)
CR-002	5700 L (1500 gal)
Sump #2	3790 L (1000 gal)
CR-003	15,100 L (4000 gal)
Sump #3	1500 L (400gal)
CR-011	132,500 L (35,000 gal)
Sump #11	3790 L (1000)

2.5.2.1 Tank CR-001 and the Associated Sump

The exact waste volume in tank CR-001 is not known. Instrumentation for liquid level measurement in the tank is not operational. The waste volume after the last known transfer in June 1982 was 7380 L (1,950 gal). Subsequent liquid level readings were questionable because of deterioration of the instrument. The waste volume at the present may be slightly smaller as a result of evaporation.

The waste in tank CR-001 has never been sampled. Chemical and radiological characteristics of the waste are estimated from historical records and process knowledge. Waste transfer records show that tank CR-001 received supernatant waste from Tank 241-C-109 in 1955 (Anderson 1990) and from Tanks 241-C-108 and 241-C-110 in the mid-1990s. At that time, the C Farm tanks contained uranium recovery waste. The Hanford Defined Waste (HDW) model (Agnew 1997) provides estimates of chemical and radiological properties for this waste. The concentration estimates for significant components in the waste are summarized in Table 2-2.

Table 2-2. Concentration Estimates for Tank CR-001
(Based on Agnew 1997).

Component	Supernatant (mole/l)	Sludge (mole/l)
%Water	74%	22%
TOC	0.000386 wt. %C	0.000113 wt. %C
CO_3	0.193	0.427
OH	0.0123	4.72
NH_3	7.6E-04	0.000434
F	0	0
NO_2	0.21	0.152
NO_3	2.59	13.38
SO_4	0.144	0.065
PO_4	0.132	0.060
Al	0	0
Na	3.92	14.04
Fe	0.002	1.57
Mn	0	0
Ni	0.001625	0.000736
Cr	0.00325	0.00147
Zr	0	0
^{90}Sr	1.94E-04 Ci/l	5.16E-03 Ci/l
^{137}Cs	1.28E-01Ci/l	1.04E-02 Ci/l
^{238}U	1.23E-07 Ci/l	2.56E-08 Ci/l
^{239}Pu	6.05E-06 Ci/l	2.74E-06 Ci/l
^{241}Am	1.35E-06 Ci/l	6.11E-07 Ci/l

It is not known whether the sump associated with tank CR-001 contains any liquid. If liquid is present, it would likely be from rainwater/snowmelt runoff. It will be assumed for planning purposes that 3790 L (1000 gal) of liquid is present in the sump.

2.5.2.2 Tank CR-002 and the Associated Sump

The exact volume of the waste in tank CR-002 is not known. A liquid level reading taken on June 1, 1987, indicated the tank contained 17,790 L (4,900 gal) of sludge at that time. A more recent reading taken on November 14, 1995, indicating 5700 L (1500 gal) will be used, though the reliability of the measurement instrument may be questionable (Grams et al. 1999).

Tank CR-002 was used as an acid digestion tank. Nitric acid was mixed with sludge waste from tank CR-001 to dissolve solids. The resulting slurry (known as PUREX Acidified Sludge or PAS) was transferred to B Plant for strontium recovery. The waste in the tank is likely to be residual PAS.

The waste in tank CR-002 has never been sampled. However, characterization data for PAS from another tank (AR-001) could be used to estimate the concentrations of chemicals and radionuclides in the sludge (Grams et al. 1999). The HDW model also provides concentration estimates for this waste stream (Agnew 1997). A summary of the estimates for major components in the tank is provided in Table 2-3.

Table 2-3. Concentration Estimates for Tank CR-002 (Based on Agnew 1997).

Component	Supernate (mole/l)	Sludge (mole/l)
%Water	91%	69%
TOC	0	0
CO_3	0.15	0.22
OH	0.011	4.5
NH_3	1.7E-024	0.20
F	3.9E-04	3.23E-04
NO_2	0.48	0.64
NO_3	0.30	0
SO_4	0.08	0.068
PO_4	0.023	0.019
Al	0.022	0.071
Na	1.41	5.65
Fe	0.002	1.30
Mn	0.003	0.0022
Ni	0.0018	0.14
Cr	0.017	0.014
Zr	4.58E-08	3.8E-08
^{90}Sr	3.4E-02 Ci/l	12.4 Ci/l
^{137}Cs	3.14E-01Ci/l	1.04E-02 Ci/l
^{238}U	1.88E-07 Ci/l	0.26 Ci/l
^{239}Pu	7.92E-05 Ci/l	6.58E-05 Ci/l
^{241}Am	3.0E-05 Ci/l	1.68E-03 Ci/l

It is not known whether the sump associated with tank CR-002 contains any liquid. If liquid is present, it would likely be from rainwater and snowmelt runoff. The assumption for planning purposes is that 3790 L (1,000 gal) of liquid is present in the sump.

2.5.2.3 Tank CR-003 and the Associated Sump

The volume of waste in tank CR-003 is approximately 15,100 L (4,000 gal). Liquid level measurements are taken daily via a manual tape. The tank was used originally for acid digestion in the uranium recovery process. Until 1995, the sludge heel in this tank was considered to be PAS and sludge from Hot Semi-Works tank CX-70. In 1995, tank CR-003 was used in the SST stabilization of tanks 241-C-102, 241-C-107, and 241-C-110. In January and February 1998, the tank received intrusions, likely from rainwater, totaling 1703 L (450 gal). On January 6, 1998, an operational error caused an intrusion of approximately 1250 L (330 gal) of raw water into the tank (Grams et al. 1999). In summary, the remaining solids, if any, in tank CR-003 likely came from PAS and Hot Semi-Works sludge; the liquid is likely to be a mixture of rainwater, raw water, and supernatant from Tanks 241-C-102, 241-C-107, and 241-C-110.

Concentrations for components in the sludge are estimated from the HDW model (Agnew 1997). Concentrations for components in the supernatant are estimated from analytical data for the CFarm tanks, adjusted to account for the added water. A summary of the estimates is provided in Table 2-4.

Table 2-4. Concentration Estimates for Tank CR-003 (Supernatant estimates based on Tranbarger 1991; sludge estimates based on Agnew 1997). (2 sheets)

Component	Supernatant (mole/l)	Sludge (mole/l)
%Water	86%	69%
TOC	2.0 g/l	0
CO_3	0.27	0.22
OH	0.52	Not known
NH_3	NA	0.20
F	NA	3.23E-04
NO_2	0.59	0.64
NO_3	0.53	0
SO_4	0.074	0.068
PO_4	NA	0.019
Al	0.075	0.071
Na	2.36	5.65
Fe	4.0E-04	1.30
Mn	6.3E-06	0.0022

Table 2-4. Concentration Estimates for Tank CR-003 (Supernatant estimates based on Tranbarger 1991; sludge estimates based on Agnew 1997). (2 sheets)

Component	Supernatant (mole/l)	Sludge (mole/l)
%Water	86%	69%
Ni	NA	0.14
Cr	2.4E-03	0.014
Zr	NA	3.8E-08
^{90}Sr	4.5E-04 Ci/l	12.4 Ci/l
^{137}Cs	1.9E-02Ci/l	1.04E-02 Ci/l
^{238}U	NA	0.26 Ci/l
^{239}Pu	1.2E-04 Ci/l	6.58E-05 Ci/l
^{241}Am	NA	1.68E-03 Ci/l

Video examination of the sump associated with tank 244-CR-003 taken in 1997 indicated the presence of an estimated 1500 L (400 gal) of liquid in the sump. The liquid is assumed to be an accumulation from rainwater and snowmelt runoff.

2.5.2.4 Tank CR-011 and the Associated Sump

The liquid level in tank CR-011, taken on March 24, 1986, after the last known transfer, was 135,060 L (35,683 gal). The bulk of the inventory is approximately 79,485 L (21,000 gal) of supernatant from Hot Semi-Works tank CX-70. The remaining inventory is expected to be rainwater pumped to the tank from drainage sumps in the Hot Semi-Works and 244-CR Vault Facilities.

A sample of waste was taken from tank CR-011 on October 3, 1981. Analytical results are provided in Table 2-5.

Table 2-5. Concentration Estimates for Tank CR-011.

Component	Supernatant (mole/l)
Al	<0.35
OH	0.095
CO_3	0.033
NO_2	0.087
TOC	0.15 g/l C
^{137}Cs	1.64E-3 Ci/l
Pu	1.78E-5 g/l

It is not known whether the sump associated with tank CR-011 contains any liquid. If liquid is present, it would likely be from rainwater and snowmelt runoff. The assumption for planning purposes is that 3790 L (1,000 gal) of liquid is present in the sump.

2.5.3 Liquid Conditions Through Interim Stabilization

The plan is to transfer waste out of the 244-CR Vault Facility through tank CR-003. This tank was used in 1995 during the stabilization of several C-Farm single-shell tanks. The transfer pump in the tank is assumed to be operable, and the transfer configuration to diversion box 241-ER-153 remains in place.

Current estimates for the total volume of liquids in the tanks and sumps are conservative and do not account for evaporation of the liquid since the last level measurements. The actual volume of the liquid and sludge in the tanks and sumps will be determined when the vault is accessed to verify the configuration of the existing equipment. For planning purposes, a total volume of 173,740 L (45,900 gal) of liquid, including the estimates for the sumps, is assumed at this time. Pumpable liquid from the tanks and sumps in the vault will be staged in tank CR-003. The total capacity of tank CR-003 is 56,770 L (15,000 gal) with an operating capacity of 45,420 L (12,000 gal) (80% of total tank capacity). Although it may vary as a result of the quantities of liquid and sludge that are found in the tanks, it is assumed that four fillings and transfers, to/from tank CR-003 to a DST will be required to remove the pumpable liquids from the vault facility.

The waste in the tanks and sumps within the CR vault will be sampled early in the stabilization process as the liquid and sludge levels in the tanks also are measured. Because of the multiple fill and pump cycles required in tank CR-003, this process will avoid the lengthy delays required for laboratory analysis between transfers.

Samples taken from the tanks will be analyzed for waste components per the *Data Quality Objectives for the Tank Farms Waste Compatibility Program* (Mulkey et al. 1999). Samples taken from the sumps will be screened for pH, metals, and gamma-emitting radionuclides. Results of the screen will be used to determine whether a significant amount of waste has leaked into a sump. If a sump contains leaked waste, the samples from the sump will be analyzed in accordance with the data quality objectives (DQO). Otherwise, no further analysis would be performed, and the assumption will be that the sump liquid is water.

Based on the composition and volume data for the liquid in each tank and sump, a waste consolidation scheme will be developed. Liquids from various tanks and sumps will be consolidated into tank CR-003 so that the composition of the waste in the tank before each transfer to a DST will be known through calculations. This approach eliminates the need to wait for analytical data between transfers to perform a compatibility assessment.

In addition, composition of the waste in tank CR-003 before each transfer must be known to calculate the amounts of chemicals needed for waste chemistry adjustments. Chemical adjustment likely will be needed to satisfy the tank farm requirements for hydroxide and nitrite contents in the waste because the liquids in the sumps are pH neutral and the waste in tank CR-002 may be acidic. Hydroxide and nitrite are to be added, as needed, to tank CR-003 before each transfer.

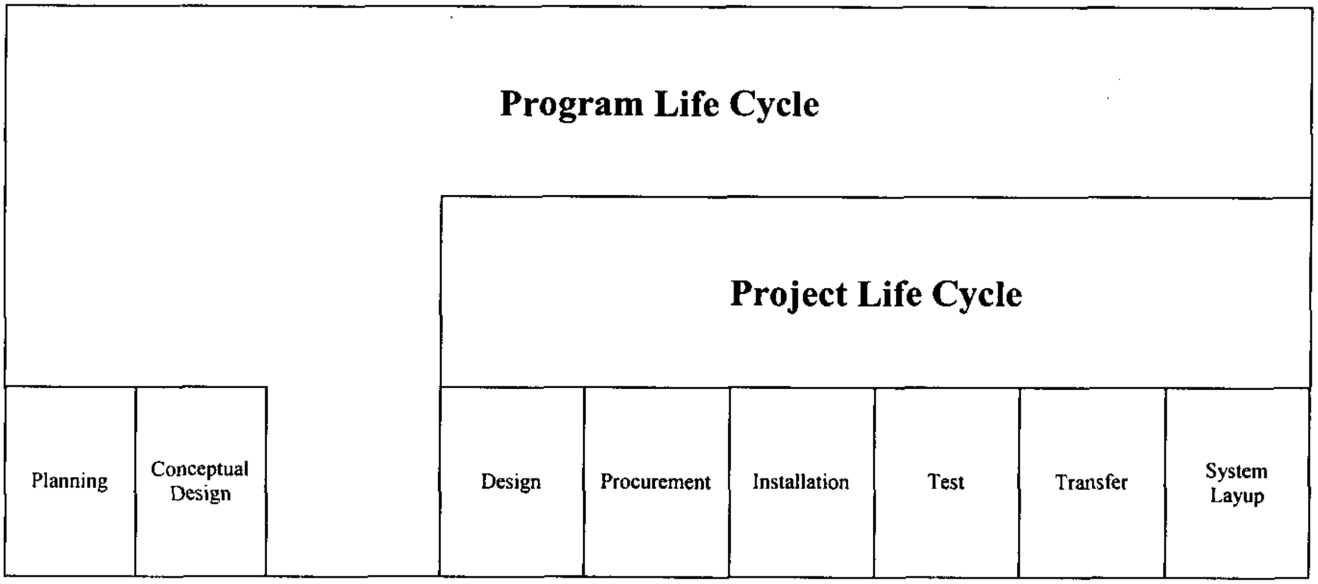
2.5.4 Stabilized Facility Configuration

The 244-CR Vault Facility will be isolated and pumpable liquids removed from the sumps and tanks. The facility will be physically disconnected from all transfer and liquid support systems. All known intrusion pathways for precipitation and snowmelt will be corrected. Periodic sump level monitoring will be in place and monitored quarterly to detect any future intrusion into the vault. The transfer system will be flushed and the drop legs left in place should any liquid accumulation require removal in the future. The active ventilation system will be secured and the exhaust duct blanked to remove the emission point. HEPA filters will be installed on each of the riser pits to allow for the passive ventilation of the tanks and cells.

2.6 MISSION LIFE CYCLE

The mission life cycle of the 244-CR Vault Interim Stabilization Project began with the planning and conceptual design of the project in FY 2000. The phases of the 244-CR Vault Interim Stabilization Project are shown in Figure 2-6.

Figure 2-6. Project Execution and Engineering Management Planning.



2.6.1 Program Planning

A significant effort has been, and is being, spent on the program planning for vault stabilization. A dedicated task team was assembled and charged with completing the planning of the project mission. A path-forward workshop was held in January 2000 to establish the requirements of the plan and develop an approach. Development of this project plan reflects the results.

2.6.2 Conceptual Design

The early stages of the planning phase of the program considered various alternatives for solving the stabilization issues at the 244-CR Facility. Although these ideas took into account the ultimate deactivation of the facility, the program goal was the near-term stabilization of the 244-CR vault as defined in Section 2.1 above. To determine the best technique for stabilization, ideas were developed and evaluated against the alternatives for accessing the liquids in the vaults and the pumping method to be used. A conceptual design using the results from that evaluation is presented in this document.

2.6.3 Design

Because of the lack of instrumentation in the 244-CR vault, data for design will be gathered in an initial evaluation of the vault tanks and sumps. Included in that effort will be the measurement of the liquid and solid waste levels as well as confirmation of the physical piping configuration in the cells and riser pits. The detailed design will be developed and drawings issued during this phase of the project. Long-lead procurement of limited items will be initiated at approximately the 80% completion level. A formal design review will ensure that all aspects of the design and all equipment requirements are evaluated properly.

2.6.4 Procurement

Procurement will include materials as well as the contracting of services to support the 244-CR effort. Commercially available equipment will be used in the installation of pumps into tanks CR-001, CR-002, and CR-011, as well as in any of the sumps that are confirmed to contain pumpable liquid.

2.6.5 Installation

This phase of the project will prepare the 244-CR Vault Facility for the installation of the fabricated and pre-tested pumping assemblies. Installation of the transfer equipment will require that some of the existing equipment be removed so the transfer pumps can be installed in those locations. The transfer pumps will be lowered into seven riser locations. Four pumps will be placed into the vault sumps, and three into tanks. The existing transfer pump and piping from CR-003 to the DST system will be used. The routing within the DST system will have to be changed to allow CR-003 to be pumped to AP Farm. Included in the installation process are utilities associated with the system. Connections for temporary services such as flush water and air are located outside the vault and will use portable units.

2.6.6 Transfer

In this phase of the project, the pumpable liquids will be transferred to tank CR-003 and chemically adjusted, as necessary, to meet DST specifications. The waste then will be transferred from tank CR-003, inside the 244-CR Facility, to an approved DST through the

241-ER-153 diversion box. Once the liquid enters the 241-ER-153 diversion box, it can be transferred to AP Farm through various routes. The exact route will be determined in the final design phase with concurrence of DST transfer cognizant engineers.

2.6.7 Isolation

This phase of the work within the project will isolate the facility from any lines that could transport liquids to the vault. Isolation will include the process lines, such as water and steam, as well as the waste transfer lines having an interface external to the 244-CR Vault Facility.

2.6.8 Intrusion Prevention

Some of the liquid contained in the vault results from the intrusion of precipitation and snowmelt. This phase of the project will close off those paths of intrusion. Known paths for these intrusions include drains to the facility and leakage into those vaults that drain to the sumps.

2.6.9 System Lay-up

Following the completion of the last waste transfer, a passive vent system will be installed. The active ventilation system will be shut down. The sump monitoring equipment will be left active so that it can be used to monitor for future intrusions. The sump pumps will be left in a condition that will allow water to be pumped out if an intrusion is detected.

2.7 MISSION-LEVEL REQUIREMENTS

The mission-level requirements for the 244-CR Vault Interim Stabilization Project are to remove the pumpable liquids from the estimated 173,740 L (45,900 gal) of waste in the 244-CR Vault Facility and meet the other planning requirements defined in PI ORP 3.3.1. The criteria for the stabilization of the facility are included in the performance requirements of the PI by reference and defined in TPA Change Control Form M-45-99-02. The six criteria for the stabilization of the facility are as follows:

1. The removal of pumpable liquids from 244-CR vault tanks
2. The removal of pumpable liquids from the vault itself and its associated sumps
3. Isolation of the 244-CR vault
4. Provisions for the removal of pumpable liquids which may accumulate in the future
5. Installation of intrusion prevention mechanisms as may be necessary
6. Establishment of periodic liquid-level monitoring systems for the detection of accumulating liquids prior to final closure

The Project Plan also will describe the scope of work necessary to stabilize the facility as well as the cost estimate and schedule for that work.

The technical strategy for the stabilization of the facility is described in Section 3.0, and the endpoint definitions are defined in Appendix A.

2.8 OBJECTIVES AND MEASURES OF SUCCESS

The primary objective of the 244-CR Interim Stabilization Project is to provide for planning and removal of the pumpable liquids in the vault facility. The measures will be based on the timeliness and completeness of the planning and the desired end states of the project work. These measures will be used to verify that the 244-CR team has executed its mission effectively. Table 2-6 summarizes the measures of success for the 244-CR Vault Interim Stabilization Project planning effort. Measures for the success of the stabilization project are included in Appendix A.

2.9 STABILIZATION OPTIONS AND EVALUATION

A dedicated project team was assembled to evaluate the alternatives for removal of the pumpable liquids from the 244-CR vault. The requirements of the mission are defined in PI ORP 3.3.1. Because the schedule for preparation of the facility for deactivation and the deactivation itself have not yet been defined, equipment that is used or installed for stabilization and removal of the liquids was not assumed to stay in place or be maintained pending deactivation. Options for the removal of the pumpable liquid from the facility were limited because of the current condition of the facility.

Because the steam supply has been disconnected and access to the steam jet lines buried, activation of the steam system would require excavation and possible removal of the concrete cover blocks as well as a new or portable source. These conditions make the reintroduction of steam very difficult and require a manifold for distribution to the sumps. Because of dose rate and ALARA considerations related to the pump pits, it was desirable not to enter the pump pits. The tanks were equipped with mechanical pumps for the removal of waste. Abovegrade connections for the power to the pumps have been removed, and the operability of the pumps and agitators is questionable. The previous use of a submersible pump in the cell 3 sump was successful and verified the access path to the sumps through the riser pits. The operations cost history shows steam costs to be prohibitive. A temporary system could be put in place to pump the existing liquids and then left in place to satisfy the requirements for potential future pumping of intrusions.

Table 2-6. Measures of Success for 244-CR Vault Stabilization Planning.

Performance Deliverable	**Source**	**Measure of Success**
Submit 244-CR Vault Stabilization Project Plan to ORP by 4-28-00.	PI ORP3.3.1	Submit the Project Plan to ORP by formal letter by April 28, 2000.
Address the six items listed in TPA Milestone M-45-11A. (ref. TPA Change Control Form M-45-99-02)	PI ORP3.3.1	Address the stabilization activities as defined in the Performance Incentive. 1. The removal of pumpable liquids from 244-CR Vault tanks. 2. The removal of pumpable liquids from the vault itself and its associated sumps. 3. Isolation of the 244-CR Vault. 4. Provisions for the removal of pumpable liquids which may accumulate in the future. 5. Installation of intrusion prevention mechanisms as may be necessary. 6. Establishment of periodic liquid level monitoring systems for the detection of accumulating liquids prior to final closure. (See Section 3.0)
Describe the scope of work necessary to stabilize the vault until the facility may be turned over for final disposition and closure.	PI ORP3.3.1	Include scope of work required. (See Section 6.0)
Provide a cost estimate for performing the work.	PI ORP3.3.1	Include cost estimate for work required. (See Section 6.0)
Provide schedule for the completion of the work.	PI ORP3.3.1	Include a schedule for work required. (See Section 6.0)

2.10 PATH FORWARD

The path forward provides for interim stabilization of the 244-CR Vault Facility. This activity will meet the requirements for interim stabilization as explained below.

2.10.1 Liquid Transfer

Pumpable liquids will be transferred through the installation of a temporary pumping system that does not require the removal of the pump pit cover blocks, resetting of piping jumpers, or reactivation of the steam jets. Access to the liquids in the cell sumps and the process tanks will be through existing piping penetrations in the riser pits. Penetrations will provide access to the sumps as well as to the tanks. The actual liquid transfers will be performed in multiple consolidation and transfer cycles. Because there is an operational pump in tank CR-003 and the piping connections for that tank are in place, that tank will be used to consolidate and stage the waste for transfer to a DST. Because the estimate of pumpable liquid exceeds the capacity of the tank, the number of transfers necessary is estimated at four. This number could be influenced by the sampling analysis and adjusted for internal sequencing and DST destination.

2.10.2 Isolation and Intrusion Prevention

The 244-CR Vault Facility will be isolated from process lines such as water and steam to prevent the reintroduction of liquids to the facility. Waste transfer lines that connect the 244-CR Vault Facility to C Farm, diversion boxes, or DST facilities will also be isolated to prevent the reintroduction of waste to the facility. The primary method of isolation is to provide a mechanical block in these lines either at the supply end of the line segment connecting to the vault or within the 244-CR vault itself. An alternative method for isolating seepage into buried vaults or buried encasements may be an evaluation to verify that precipitation and snowmelt do not penetrate to the depth required to enter the structure.

Intrusion paths for precipitation and snowmelt that have been confirmed as a source of liquids in the past also will be blocked mechanically. Typical blocking mechanisms used in the past include grouting the drains that connect to the vault, foaming over the vaults and pits containing drains routed to the vault, and sealing the cover blocks that allow leakage access directly to the vault.

2.10.3 Facility Monitoring

Liquid-level monitoring equipment will be installed in each of the sumps to detect any future accumulation of liquid. This equipment will be maintained, and read periodically. Tank monitoring will not be required as the pumpable liquid is removed from the tanks and the connecting lines are isolated.

2.10.4 Capability to Pump

The drop leg portion of the pumping system used to transfer the pumpable liquid from the 244-CR vault will be left in place to assist in the removal of any liquids that may accumulate after the stabilization and isolation of the 244-CR vault. The aboveground jumper and services that use a portable or temporary source, (e.g., a water truck, portable air compressor, or power generator) during the pumping, will not be required to remain in place in anticipation of a future intrusion. Those connections will be maintained for future use if required.

3.0 TECHNICAL STRATEGY

3.1 TECHNICAL OBJECTIVE

The primary technical objective of the 244-CR Vault Interim Stabilization Project is to stabilize the vault by removing the remaining pumpable liquid from the 244-CR vault tanks and sumps. Liquids are known to be present in all four of the process tanks and in one of the four sumps. Pumpable liquid is assumed to be present in the remaining three sumps as a result of precipitation and snowmelt leakage before the cover blocks were sealed. In parallel with the effort to remove the liquids, two additional tasks will be performed.

- The facility will be isolated from process liquid and waste transfer lines to prevent any future introduction of liquids into the vault.
- The known paths of precipitation and snowmelt intrusion into the vault will be blocked to prevent future introduction of liquids into the 244-CR vault. Monitoring capability will be left in place in the sumps to detect any future intrusions of liquid. The pumping systems will also be left in place to provide the capability for future liquid removal should such intrusions occur.

3.1.1 Liquid Removal

The pumpable liquid in the vault (see Figure 2-1) will be removed in accordance with the criteria and deliverables defined in Appendix A. This objective includes the design, fabrication, testing and installation of a transfer system that will permit pumping the liquid to a receiving DST.

3.1.2 Isolation

The piping now connected to the 244-CR vault will be blocked mechanically to prevent the reintroduction of liquids to the vault. Process lines as well as waste transfer lines will be blocked in accordance with the criteria and deliverables in Appendix A.

3.1.3 Intrusive Prevention

The known paths for the intrusion of precipitation and snowmelt will be blocked to prevent future intrusions to the 244-CR vault. These paths include designed paths such as facility drains as well as suspected paths from pump pit and riser pit cover leaks. This work will be performed to the criteria and deliverables defined in Appendix A.

3.2 TECHNICAL APPROACH

The technical approach to stabilizing the 244-CR vault requires equipment and activities in five main areas:

- Designing and installing a system that can consolidate the pumpable liquid from the four tanks and four sumps into one tank and subsequently transfer the combined waste to a designated DST
- Isolating waste transfer and process lines
- Preventing intrusions
- Monitoring sumps
- Establishing provisions for future pumping.

A diagram of the consolidation and transfer system is shown in Figure 3-1.

3.2.1 Waste Consolidation and Transfer System

The system for consolidating and transferring waste will require installing equipment and implementing a supporting AB. The NS&L strategy to support installation and operation of this system is discussed in Section 4.2.

The waste consolidation and transfer system comprises a number of components and subassemblies. Major components, subassemblies, and support systems include the following:

- Drop legs
- Transfer line
- Instrumentation
- Chemical adjustment.

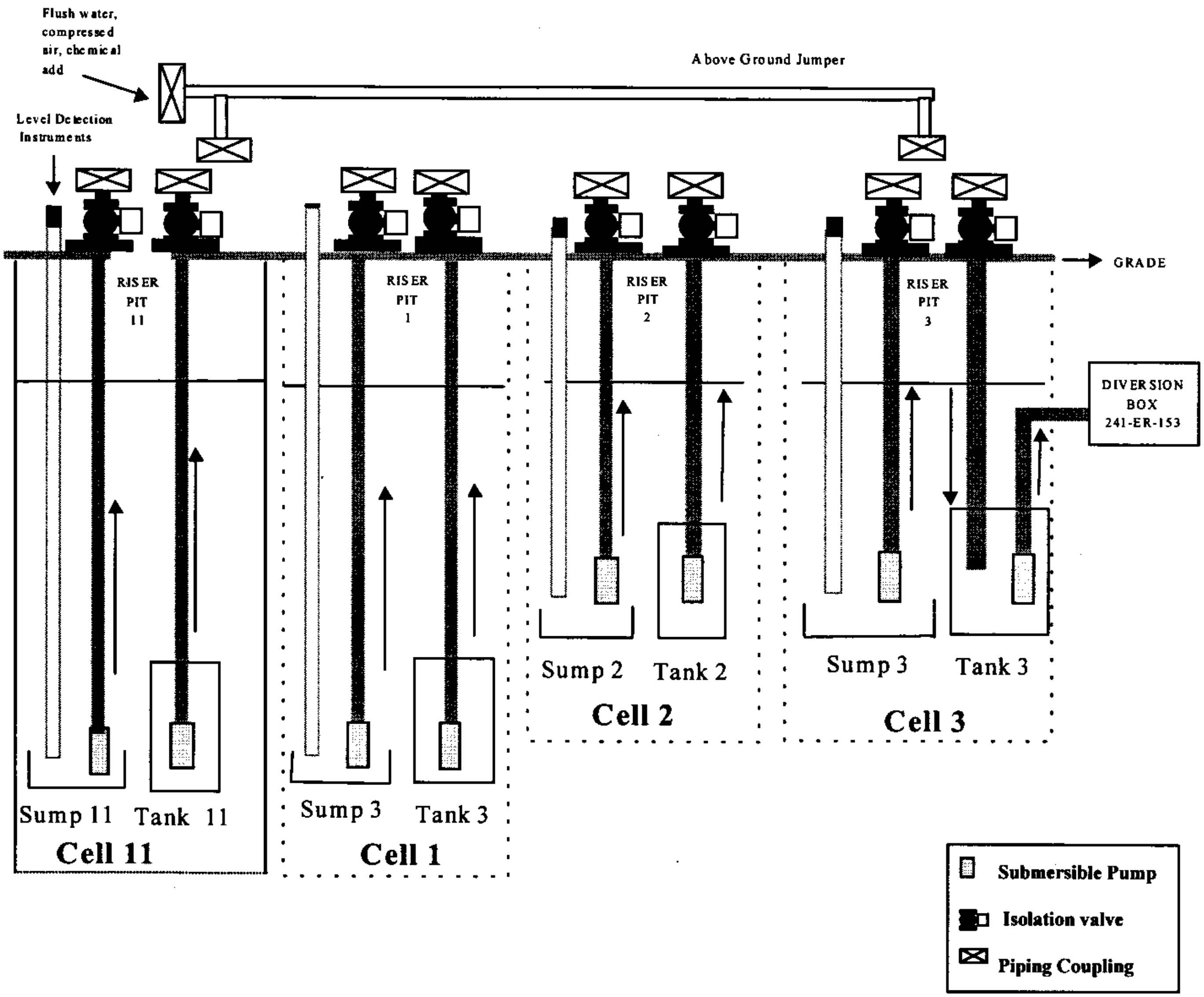
3.2.1.1 Drop Legs. Two types of drop legs, pump (out) and return (in), are being used.

The pump legs will have a quick-disconnect coupling on one end and a submersible pump on the other end. The two ends will be connected by either a chemical-resistant hose or pipe. The submersible pump will be lowered into either a tank or a sump via existing riser access ports.

The return leg will have a quick-disconnect coupling on one end and an open-end pipe on the other end. The return leg will be flanged into place in an open riser access port in tank CR-003. The primary purpose of this leg is to provide an inflow path to consolidate tank and sump waste. A plan view of the riser pits and access openings is shown in Figure 3-2.

Submersible pumps will be used to consolidate the waste. Final pump selection will be determined by whether it can fit through a 6-in. riser.

Figure 3-1. 244-CR Vault: Temporary Transfer System Diagram.



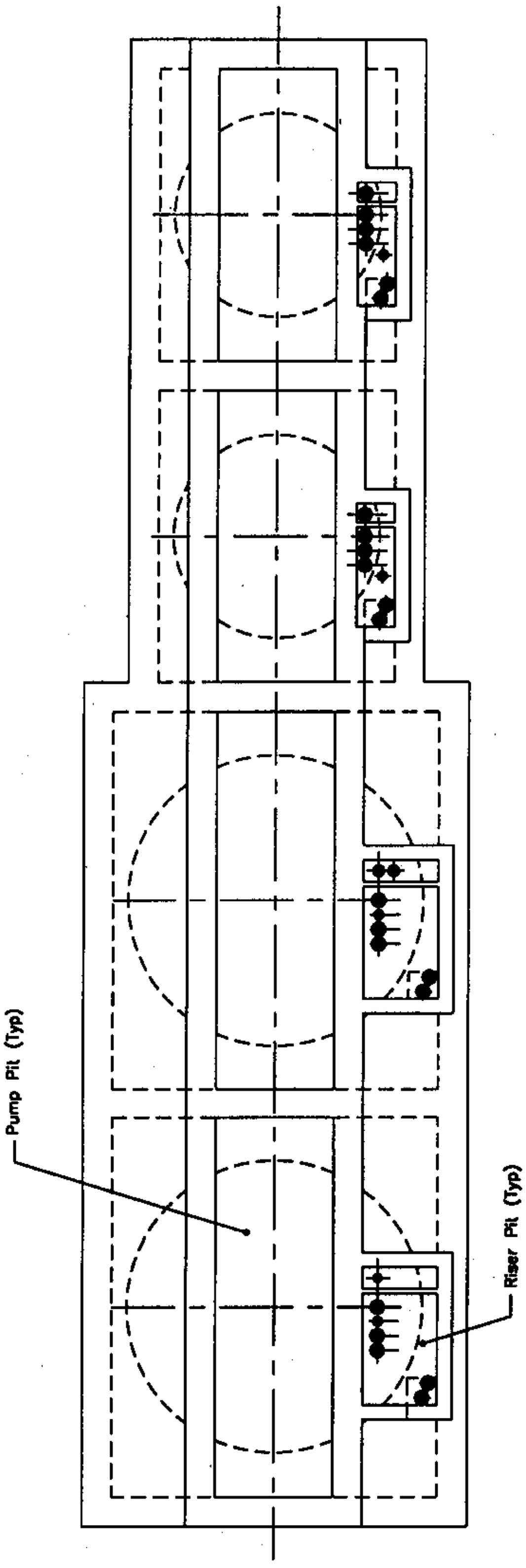


Figure 3-2. 244-CR Vault Facility Plan View.

102'-0" LONG
26'-0" WIDE (NW END)
20'-0" WIDE (SE END)
52'-10" HIGH (NW END)
42'-10" HIGH (SE END)

NOTE: General layout of floor penetrations are shown for Riser Pits only.

3.2.1.2 Transfer-Line Assembly. This subassembly is designed to allow the aboveground connection of any of the pump legs to the return leg in tank CR-003. The transfer line will be a hose-in-hose design with connections for flushing, air purging, and chemical addition. The safety classification will be determined after samples have been obtained from the vault tanks. The existing underground transfer line from tank CR-003 to the DST facility will be used.

3.2.1.3 Sampling System. Samples will be obtained from the tanks during a pre-inspection of the vault tanks and sumps. The samples will be obtained by lowering a bottle on a rope through an open riser into the tank.

3.2.1.4 Sample Analysis. The samples will be analyzed to determine what is in the tank. This analysis then will be used to determine shielding requirements, safety classification of equipment, compatibility to the DST system, and the consolidation scheme.

3.2.1.5 Instrumentation and Control System. The submersible pump that goes into the vault sumps will have a level detection system attached to it. This system will allow the sump to be monitored in the future to determine when the sump liquid level exceeds the sump volume capacity. It also will be used to determine when the sump is empty during initial waste transfer. Tank CR-003 has a pump control station for its transfer pump. The control station has only a start and stop switch. A manual tape installed in tank CR-003 will be used to determine liquid level in the tank before, during, and after transfers.

3.2.1.6 Ventilation. The CR Vault has an active ventilation system that provides vacuum for the tanks as well as the for process cells. This system will be maintained until the tanks are emptied and isolated, at which time a passive ventilation system will be installed and the active system will be shut down.

3.2.1.7 Chemical Adjustment. The chemical adjustment will occur in tank CR-003. The adjustment requirements will be determined from the sample analysis. Chemicals will be added to the tank via the transfer hose or the return leg quick-disconnect coupling. The chemicals that might have to be added are NaOH and $NaNO_2$. These will be pumped from a chemical truck or a 208 L (55 gal) drum into the consolidation tank. The mixing of chemicals will come via transfers into or from CR-003.

3.2.1.8 Utilities. The utilities required for 244-CR vault stabilization include the electrical power (required to operate the pumps and instrumentation), compressed air, flush water, chemical addition, and dilution water. Power to operate the pumps will be obtained from existing motor control centers or from an auxiliary generator. The flush water will be supplied from water trucks. Compressed air (primarily to blow down the transfer line after the transfer) will be obtained from a portable compressor. The air system will share the flush water connection on the transfer line.

3.2.2 Waste Transfer and Process Line Isolation

One of the requirements of the PI is to isolate the 244-CR vault. Isolation of the vault will require addressing waste transfer lines and process lines. Figures 3-3 and 3-4 show the general layout of the waste transfer and process line and the locations where isolation could be achieved.

3.2.2.1 Waste Transfer Lines. There are two types of transfer lines used at the 244-CR Vault Facility. One type is used to make transfers between facility tanks and sumps; the other is used to transfer waste to or from outside facilities such as SSTs, DSTs, or B Plant. Many of these routes go through diversion boxes. Because the sump-to-tank and tank-to-tank transfer lines are within the scope of the facility boundary, they do not have a source of liquid, and isolation is not required. This activity will ensure that the transfer lines are isolated at the 244-CR wall nozzle or at the other end of the line segment, within a diversion box, or at B Plant. This activity will not require that transfer lines be blocked at both ends.

3.2.2.2 Process Lines. Process lines are lines that supply various services to the 244-CR Vault Facility and typically enter from the west side of the vault. For this activity, all lines that could contain liquids will be isolated. Examples are water lines, drain lines, and chemical addition lines.

3.2.3 Intrusion Prevention

PI ORP 3.3.1 includes a requirement to prevent further intrusion of liquids into the 244-CR vault. A number of intrusion paths, including the following, have been identified:

- Transfer line encasement drains
- Drain lines from filter pits, ventilation system, valve pits, etc.
- Cover block leakage.

This activity will identify all known intrusion paths and implement various preventive measures to mitigate the possibility of future liquid intrusions. Some methods of isolation include, but are not limited to, the following:

- Grouting/plugging drains
- Sealing cover blocks
- Cutting and capping drain lines where possible

3.2.4 Monitoring

Plans are to install a monitoring system in each of the sumps. This system will be designed to satisfy the WAC 173-303 requirement for monitoring and will be used during the 244-CR Vault Facility stabilization work.

3.2.5 Provisions for Future Pumping

To satisfy the requirements of the PI, a transfer system must be available to remove any liquid that may enter the vault once the initial pumpable liquid has been removed. The transfer system used to remove the pumpable liquid will be laid up in the facility and be available to provide future pumping capability to each sump.

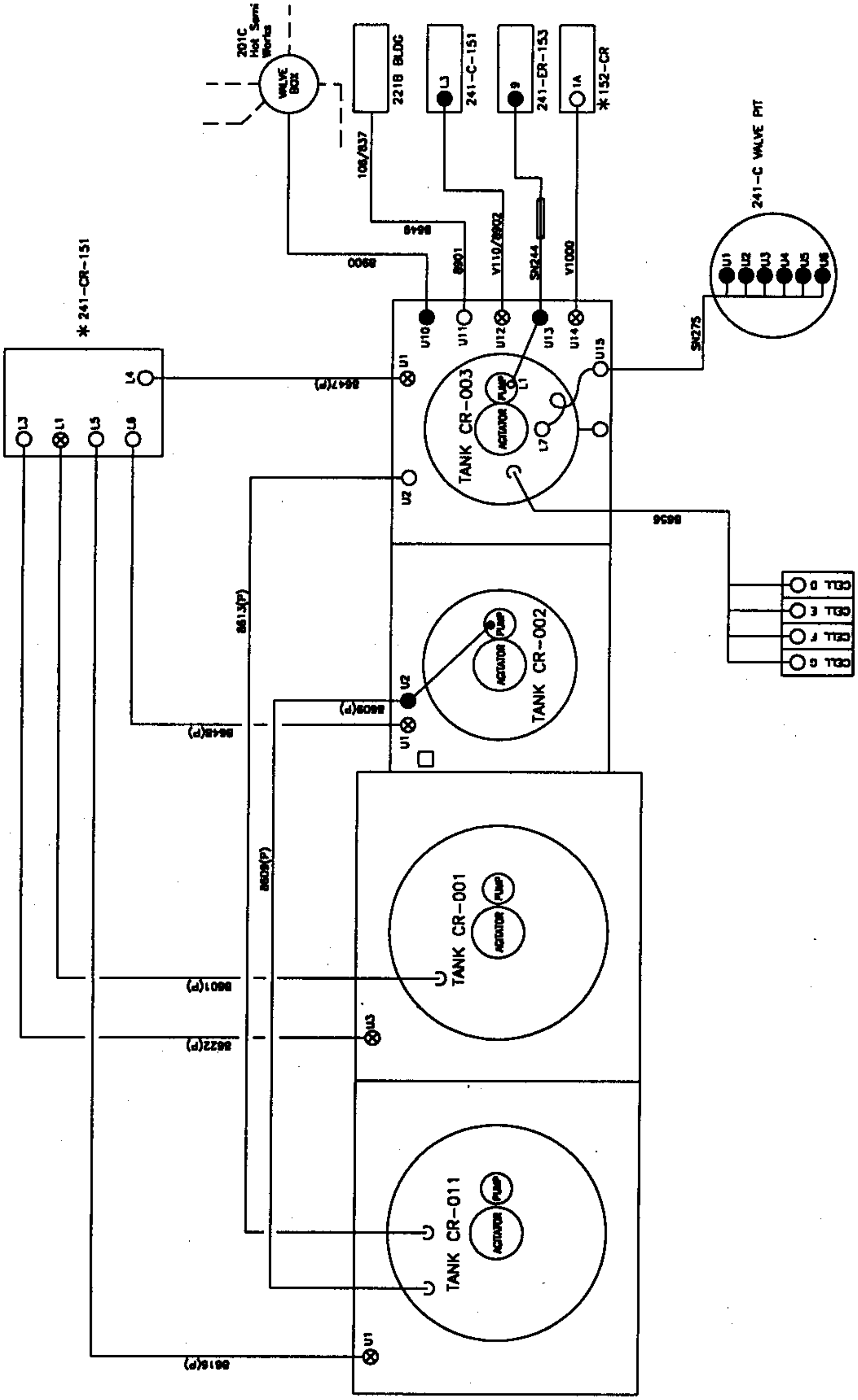
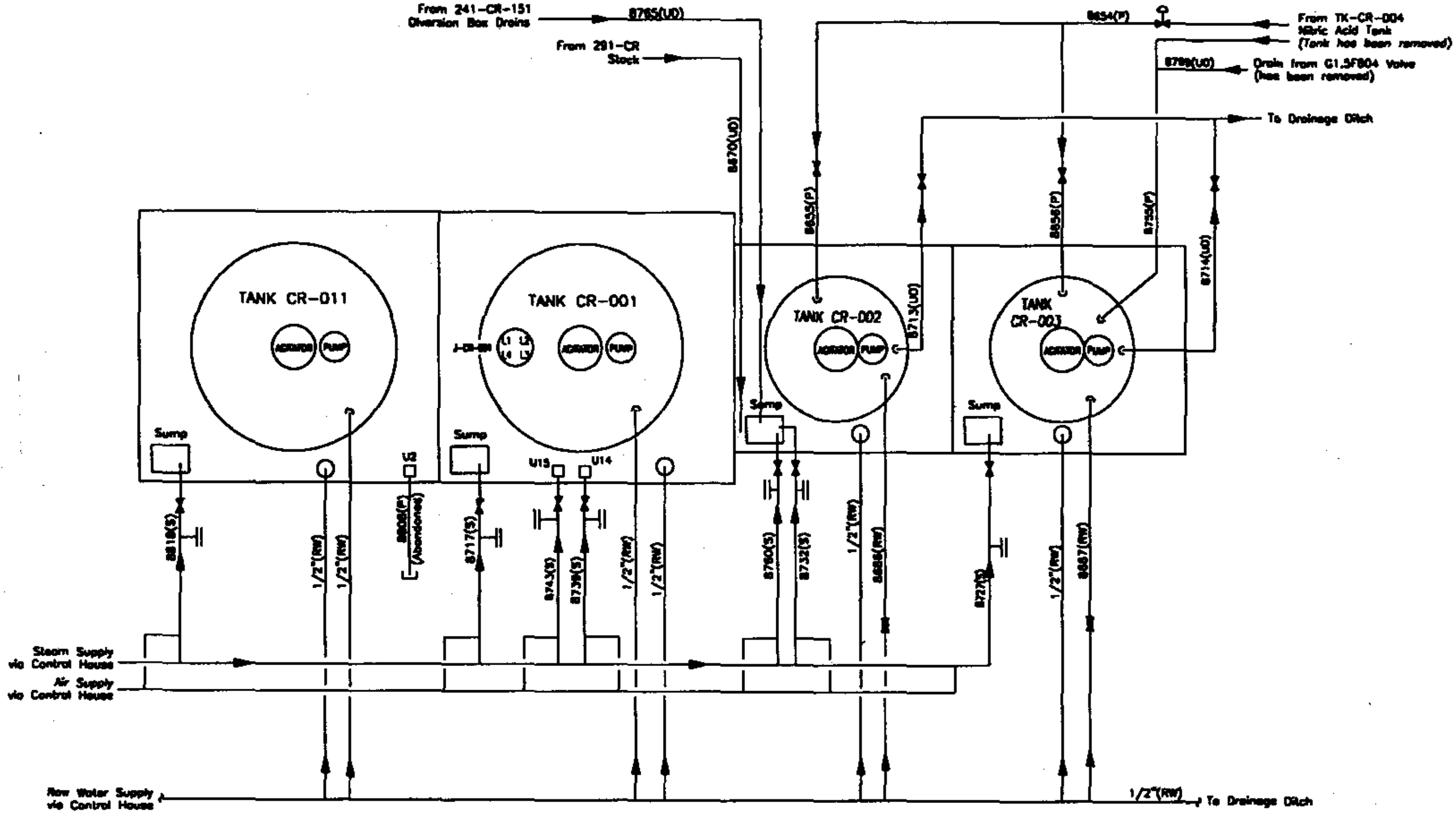


Figure 3-3. Waste Transfer Line Isolation Points.

Figure 3-4. Process Line Isolation Points.



3.2.6 Use of Existing Technology.

The transfer system and monitoring system will use off-the-shelf commercial components. New technology is not expected to be required.

3.2.7 Staffing

Current Tank Farm Operations staff will perform the project work. Task-specific training will be provided as required.

3.2.8 Deactivation Turnover

The work that is being done in this project meets some of the requirements for turning the 244-CR Vault Facility over to a decontamination and decommissioning (D&D) contractor. All the documentation will be saved for turnover to the deactivation organization.

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4.0 PROJECT STRATEGY

4.1 OPERATIONS AND MAINTENANCE

Equipment installation, operations, and maintenance activities are key to the success of the 244-CR Vault Interim Stabilization Project. Sections 4.1.1 and 4.1.2 address project strategy as it relates to operations and maintenance personnel.

4.1.1 Operations Strategy

The operations strategy for the 244-CR Vault Interim Stabilization Project is based on the applicable requirements established in DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*. The applicability matrix for DOE Order 5480.19 is defined in HNF-IP-0842, Volume 2, Section 4.1.1 (CHG 2000).

The operations strategy must support two separate activities: equipment installation and waste transfer operations. To support the installation and testing of project equipment while maintaining adequate support for other Tank Waste Operations (TWO) projects, a team of personnel will be selected from several TWO organizations. This team will be matrixed to the 244-CR Project manager and will be assigned for the duration of the installation activities. Generally, this team will support operations on day shift only, but may be assigned to shift work if required for installation or testing activities.

The operations approach to support the actual transfer is patterned after the Interim Stabilization organization pumping team. Because transfer activities are of a relatively short duration, only a dedicated group of personnel will receive the training required to perform the transfers. This group will be assigned to staff the transfer operation as needed to avoid unnecessary shutdowns.

4.1.2 Maintenance Strategy

The maintenance strategy for the 244-CR Vault Stabilization Project is based on the requirements established in DOE Order 4330.4B, *Maintenance Management Program*, Chapter 2, "Maintenance Optimization for Essential Equipment Reliability"; INPO 85-032, *Preventive Maintenance*, Good Practice MA-307; and INPO-89-009, *Plant Predictive Maintenance*, Good Practice MA-316.

The strategy consists of a preventive and predictive maintenance program that includes the proper skill mix of crafts to install and remove equipment and to provide preventive, predictive, and corrective maintenance. Resources will be assigned from the Tank Farm Contractor (TFC) Maintenance Organization (East Area Maintenance). Because the actual operating schedule is of very short duration, calibration and preventive maintenance will be performed one time before start-up and then on an as-needed basis over the term of the actual transfer. The strategy is designed to balance early detection of conditions with actions that will ensure reliability and as-low-as-reasonably-achievable (ALARA) consideration of maintenance personnel.

If necessary, shift support and/or overtime will be used during transfer activities to meet the schedule.

Maintenance of 244-CR vault level-monitoring instrumentation on tank CR-003 is funded and maintained by Tank Farm Operations; post-stabilization funding and maintenance of installed level-detection equipment will continue to be handled in the same manner and is excluded from this project maintenance strategy.

4.2 NUCLEAR SAFETY AND LICENSING

The NS&L strategy for this project is to provide needed amendments for pumping liquids from the vault and to obtain DOE approval as required. Depending on the final details of the design, such amendments may include a hazard evaluation, accident analysis, controls, and DOE approval before work begins. Alternatively it may require only an update of the FSAR once the work is finished. As a result of the work, analysis, and licensing tasks, it is likely that this facility (244-CR tank 003 is considered a DCRT) will be able to be removed from the flammable gas unresolved safety questions (USQ) list.

4.2.1 Nuclear Safety Analysis Process

The nuclear safety analysis process starts with a comparison of the existing AB (the amended FSAR) to the planned activities (collecting pumpable liquids into tanks and then pumping the liquid to a DST). A USQ screen will be performed on the planned activities. If there is no USQ, the project can proceed with facility changes and execution of the plan. If there is a USQ, then an amendment will have to be drafted and submitted to DOE for approval through a safety evaluation report (SER).

If the transfer of the waste results in a USQ, the existing analysis in the FSAR will be used to the extent possible, e.g., surface leak resulting in a pool, leakage from underground pipe resulting in a pool.

The anticipated as-left status of the vault and its contents will be compared to the existing description in the FSAR. Regardless of whether an approved amendment is needed before the work because of a USQ, the FSAR will have to be changed to reflect both the changes in waste contained in the vault and other changes that result from the work. This type of change does not require DOE approval and can be done as part of the annual update.

4.2.2 Authorization-Basis Documentation and Licensing Actions

In response to concerns over flammable gas controls in waste transfer systems and DCRTs, but unrelated to this project, an amendment to the FSAR will be submitted by June 30, 2000. This amendment will be created to be consistent with the project plans and to establish appropriate controls for transferring material within the 244-CR facility. The DOE is expected to issue an SER supporting the amendment, and the amendment will be implemented during FY 2001, well before any transfer of waste is scheduled.

As a result of the interim stabilization work, the quantity of material at risk in the 244-CR vault will be reduced and better characterized than it is now. The result will be a more accurate hazard evaluation/accident analysis, if required for future lay-up controls, than those based on assumptions about waste composition. The thoroughness of the removal of the liquid and other waste will determine future licensing actions.

4.3 PERMITTING

The environmental permitting strategy addresses the permits or other environmental documents required to initiate the pumping of liquid from 244-CR via a temporary transfer system to the DST System.

4.3.1 Assumptions

The following assumptions were used to assess the environmental permitting requirements:

- The 244-CR Project will conduct intrusive activities, exhauster activities, and pumping activities, which may emit radioactive constituents to the air and therefore require an approved radiological notice of construction (NOC). The current 244-CR radiological NOC covers the majority of the work for this project and must be revised to incorporate exhauster configuration changes, potential transfer descriptions, and other activities that may produce emissions and need to be addressed.

- The 244-CR Project activities are routine and probably will not constitute a new source as defined per WAC 173-400 and WAC 173-460; thus a New Source Review Determination should be prepared to determine whether either a New Source Review Exemption or a Non-Radiological permit is required.

- The proposed response does not involve the use or introduction of chemicals significantly different from existing tank inventories or different from typical transfer procedures.

4.3.2 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires federal agencies to analyze the potential environmental effects of proposed actions during the decision-making process. A similar Washington state law, the State Environmental Policy Act (SEPA), requires state agencies such as the Washington State Department of Ecology (Ecology), to analyze environmental impacts before making decisions. Because NEPA and SEPA requirements are similar, the U.S. Department of Energy (DOE) and Ecology co-prepared DOE/EIS-0189, *Final Environmental Impact Statement for the Tank Waste Remediation System* (DOE and Ecology, 1996). All of the RPP EIS alternatives analyzed include the continuation of ongoing activities to manage the tank waste safely, e.g., transferring waste between the tanks; operating waste transfer pumps; characterizing waste; maintaining tank safety activities; and other associated monitoring, maintenance, security, and regulatory compliance activities. No additional NEPA or SEPA documentation is required before activities at the 244-CR facility begin.

4.3.3 Resource Conservation and Recovery Act (RCRA)

Ecology has been delegated authority by the Environmental Protection Agency (EPA) to administer the base the source Conservation and Recovery Act (RCRA) program in place of the federal program. Ecology RCRA requirements are found in the "Dangerous Waste Regulations," Chapter 173-303 of the *Washington Administrative Code* (WAC). The TFC is operating under "Interim Status" standards located in WAC 173-303-400 and also within an RCRA Part A permit in accordance with WAC 173-303-800. Plans for the temporary transfer of pumpable liquids from 244-CR may require a modification to the Part A permit to add the applicable treatment code.

4.3.4 Clean Air Act (CAA)

The primary federal and state regulations with air permitting requirements applicable to the 244-CR Project are contained in 40 CFR 61, *National Emission Standards for Hazardous Air Pollutants* (NESHAPS); WAC 173-400, *General Regulations for Air Pollution Sources;* WAC 173-460, *Controls for New Sources of Toxic Air Pollutants;* and WAC 246-247, *Radiation Protection-Air Emissions.* Ecology takes the lead in Washington state in enforcing pollution regulations, while the Washington State Department of Health (WDOH) is designated as the state radiation control agency by the Revised Code of Washington (RCW) 70.98. The EPA has partially delegated NESHAPS authority and enforcement responsibilities to WDOH. For the purposes of triggering air permitting requirements, any modifications and means of emitting toxic air pollutants or criteria pollutants must be examined and permitted by Ecology if required. Any means of emitting radioactive particulate to the air via the processes necessary to establish the transfer line and pump the fluid must be permitted by WDOH and EPA.

4.4 READINESS ASSESSMENT

The DOE O 425.1A, *Startup And Restart Of Nuclear Facilities,* establishes the requirements for startup of new nuclear facilities and for the restart of existing nuclear facilities that have been shut down. HNF-IP-0842, Volume I, Section 1.2, "Readiness Review Process," (CHG 2000) implements DOE O 425.1A for CHG. CHG performed a preliminary startup review determination for 244-CR Vault Interim Stabilization activities. The startup review determination uses a graded approach to examine the scope of the proposed activity and document the thought processes and logic used in determining the required depth of review. As a result of the preliminary determination, CHG intends to perform a readiness assessment for 244-CR Vault Interim Stabilization activities. This determination assumes that the stabilization will be a short-duration, one-time activity to prevent weather-related water intrusion and to clean out systems or components incidental to decontamination and deactivation activities. Also taken into account were the stabilization plan, present design, operations, and AB. The stabilization equipment design, installation, and operation are essentially the same as found throughout the tank farms. A USQ screen will be performed on the planned activities. If no USQ arises, the project can proceed with facility changes and execution of the plan. If a USQ should arise, then an amendment needs to be drafted and submitted to DOE for approval through an SER. Technical Operations and Engineering, Production Control, Maintenance, Radiological Control, and Operations personnel have been trained in the controls and activities required to support this shutdown facility. While the unique aspects of 244-CR stabilization are appreciated, the stabilization activities essentially are tasks that are performed daily throughout the tank farms.

This strategy provides guidance to line management and plant personnel for completing startup preparations in accordance with RLID 425.1A, Attachment 8.1, "Startup/Restart Requirement Summary"; and HNF-IP-0842, Volume I, Section 1.2. The HNF-IP-0842 procedure will be used to format the documents used in the readiness process.

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5.0 ASSUMPTIONS AND RISK

The assumptions below apply to the operations, technology and equipment, and the permitting of the 244-CR Vault Interim Stabilization Project. The assumptions were developed on the basis of the relative level of risk. If the assumptions are not valid, schedule and cost are likely to change and the project plan will need to be reevaluated. The schedule incorporates these assumptions into the planning basis.

5.1 KEY ASSUMPTIONS

Key assumptions are those that define the bounds of the project scope. If any of the key assumptions prove to be invalid, reevaluation of the overall effects on the program would be necessary. Following are the detailed key assumptions.

5.1.1 Project Assumptions

5.1.1.1 DOE Orders. The DOE-ORP will continue to manage the Hanford Site and the 244-CR Vault Facility until the project has been completed. DOE Orders are assumed to remain as they are, with no critical changes affecting the project.

5.1.1.2 Safety/Environmental Issues. It is assumed that no new safety or environmental reviews or requirements will be imposed that will affect the 244-CR Vault Interim Stabilization Project.

5.1.1.3 Funding Levels. Funding to meet the proposed baseline will be available to support project ramp-up and sustained operations. Funding shall be authorized sufficiently in advance to anticipate and prevent impacts to the schedule.

5.1.1.4 Support Systems. It is assumed that the analytical services facilities and the DST Farm support infrastructures will be maintained and scheduled to support this plan.

5.1.1.5 Facility Mission. No future mission is identified for the facility or any of the tanks.

5.1.1.6 Post-Stabilization Pumping. Monitoring and pumping of accumulated liquids after the facility is stabilized are not covered in the Project Plan and are outside the scope of the project.

5.1.1.7 Post-Stabilization Ventilation. To turn off the current active ventilation system, passive ventilation will be required on the four process tanks following stabilization.

5.1.2 Operating Assumptions

5.1.2.1 DST Space Availability. It is assumed that adequate space is available in the DST system for the transfer of waste from the 244-CR Facility.

5.1.2.2 Training. Existing trained staff, including crafts, health physics technicians (HPT), Industrial Hygiene staff, and chemical operators, will perform this work.

5.1.2.3 Flammable Gas. The presence of flammable gas (hydrogen) in the tanks will not eliminate work on or in the tank.

5.1.2.4 Use of Existing Electrical Equipment. Routine minor maintenance will bring required existing equipment up to functional status.

5.1.2.5 Cover Blocks. No pump pit cover blocks will be lifted to facilitate the removal of the pumpable liquids or isolation of the process and waste transfer lines.

5.1.2.6 Diversion Box ER-153. Diversion box 241-ER-153 will be used as the tie-in point to connect to the DST facility. The transfer line in ER-153 will be blanked after transfer of liquid waste but remain capable of future use, if necessary.

5.2 ENABLING ASSUMPTIONS

Enabling assumptions are those assumptions made because a decision is pending. The enabling assumptions allow development of cost and scheduling information; however, each enabling assumption carries with it the risk that the assumption is incorrect. The list of these operating enabling assumptions follows.

5.2.1 Operating Enabling Assumptions

5.2.1.1 Permitting for 244-CR Entry. No additional NOCs will be required to access the 244-CR riser pits for the purpose of gathering data. Data gathering includes video tasks below the cover blocks, taking dose readings in the cells, measuring waste levels, obtaining waste samples, and gathering radiological data.

5.2.1.2 Operational Readiness. A readiness assessment with independent contractor review will be required.

5.2.1.3 Authorization Basis. It will be necessary to revise the current "inactive" facility status and allow the material to be transferred. Adjustments to the text of the AB will be required with use of existing controls.

5.2.1.4 Sampling Analysis. Samples will be taken from each tank and sump to provide data for waste compatibility assessment and for developing a waste consolidation scheme. No further sampling will be needed during waste transfer.

5.2.1.5 DST Compatibility. With chemical adjustments, waste is compatible for transfer to DSTs.

5.2.1.6 Facility Conditions. Dome loading calculations will show that the structural integrity of the underground structure has adequate margin to facilitate the temporary transfer system equipment.

5.2.1.7 Labor Forces. Plant Forces Work Review will result in plant forces performing the work.

5.2.2 Equipment Enabling Assumptions

5.2.2.1 Tank CR-003 Transfer Pump and Jumper. The transfer pump is operational with jumper configuration in place with line integrity to pump to diversion box 153-ER.

5.3 RISKS

The Project Risk List (Table 5-1) identifies risks (see Section 6.5.3 for a more detailed discussion of the risk analysis methods and results) and handling methodologies associated with the risks. Handling actions have been incorporated into the baseline budget and schedule and have reduced risk to the point that all residual risk can now be assumed by the project. Many of the greatest risks to the project have been identified through key assumptions, as seen in Section 5.1, and are excluded from the risk analysis and risk list. Enabling assumptions as seen in Section 5.2 are referenced on Table 5-1 to show the relationship between the enabling assumptions and the risk statement. For summary results of the risk analysis performed in conjunction with creation of the risk list, see Section 6.5.3.

Risk lists are dynamic in nature. As a program progresses, new risks are identified, others are closed, and still others must be re-addressed because of changing circumstances. It will be the responsibility of the program to manage the critical risk list and modify it as the project progresses.

Table 5-1. 244-CR Vault Interim Stabilization Project Risk List (Category III). (3 sheets)

Risk Event	Risk Title	Risk Statement
670.DCA-R01	Liquid Level Change	If there is an intrusion into the facility after the waste has been transferred to the DST system, but before the close of the project, then cost and schedule impacts would be incurred.
670.DCA-R02	Critical Resource Availability	If critical resources are not available when needed, then delays will result.
670.DCA-R03	Employee Safety Issues	If an unanticipated employee safety issue occurs, then there will be costs incurred and schedule delays.
670.DCC-R01	Additional Sampling and Analysis	If samples contain a significant amount of solids, then additional analytical cost would be incurred.
670.DCF-R01	244-CR Notice of Construction Revision	If regulators require additional NOC permits or new activities are identified or the regulator requires ventilation at the conclusion of the project, then additional NOC permits or equipment configurations may be required.
670.DCF-R02	244-CR Notice of Construction Revision	If the regulator imposes unanticipated permit conditions during the permitting process, then these may require additional designs or modifications to the design of the system.
670.DCF-R03	244-CR Notice of Construction Revision	If the Air Operating Permit is established, additional wait time may be incurred for regulatory approval via public review of the revision.
670.DCF-R04	Single Shell Part A Permit Modification	If the Part B is approved and implemented, then additional limitations could be imposed that would affect cost and schedule of transferring waste to DST.

Table 5-1. 244-CR Vault Interim Stabilization Project Risk List (Category III). (3 sheets)

Risk Event	Risk Title	Risk Statement
670.DCF-R05	Single Shell Part A Permit Modification	If regulators require additional public review or a type 2 or 3 modification, then there could be significant delays to the schedule.
670.DCF-R06	244-CR New Source Review	If the New Source Review indicates a non-radiological permit is required, one will have to be prepared and approved before work begins This process will affect cost and schedule.
670.DCG-R01	ORP Concurrence	If regulators require additional NOC permits or new activities are identified, then additional NOC permits may be required.
670.DCG-R02	ORP Concurrence	If the regulator imposes unanticipated permit conditions during the permitting process, then these may require additional designs or modifications to the design of the system.
670.DCH-R01	Technical Inconsistency/Differences Between Licensing and Design	If the Authorization Basis amendment is not consistent with the technical and engineering designs, then the amendment would not support the removal of pumpable liquids from the vault. This situation could result in rework of the amendment or significant last-minute design changes or untenable controls
670.DCH-R02	Funding for DOE and Independent Reviews	If the customer decides to have a more extensive review than presently expected or requires an independent review, then it is possible that the project will be over budget by the amount of the cost of the review.
670.DCJ-R01	Low Priority	It is possible that DOE may consider the review of the amendment application low priority and delay the process.
670.DCK-R01	Tank 003 Transfer Pump	If the existing transfer pump in tank 003 fails, then additional cost and schedule variances would be realized to install a new pump in this tank.
670.DCM-R01	Inadequate Review Process	If the project fails to pass the readiness assessment, then there could be significant delays in schedule and additional costs incurred by the project.
670.DCN-R01	A/A And A/B Valve Pits	If the jumper configuration in these two pits is changed before the transfer from CR-003 takes place, two additional jumper changes will be required to create the path for the transfer to a DST. These changes will cause schedule delays; however, costs should be in incurred by the project that altered the line-up.
670.DCS-R01	Ventilation System	If there is no need to sustain tank ventilation after interim stabilization has been achieved, then budget and schedule costs associated with design, procurement, and installation of a new passive vent system may be avoided.

Table 5-1. 244-CR Vault Interim Stabilization Project Risk List (Category III). (3 sheets)

Risk Event	Risk Title	Risk Statement
670.DCU-R01	Line Isolation	If additional lines are discovered that will require isolation, then budget and schedule effects could be caused by the need to excavate and cap/plug these lines.
670.DCV-R01	Encasement Drain Lines	If concrete encasement drain lines require modification for isolation, then additional work and funds would be required.
670.SCH-R01	Additional Cost of Program Management	If there are schedule delays, then management costs will be incurred. NOTE: This "pseudo" risk was added to reflect the dollar cost of program management resulting from any extension of the project caused by risks. The likelihood data is already factored into the consequence numbers.

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6.0 PROJECT BASELINE

6.1 PLANNING PROCESS

To initiate the planning effort, a technical task team was assembled in the first quarter of FY 2000 to evaluate options for interim stabilization of the 244-CR vault in preparation for turnover for final disposition and closure. The team proposed a conceptual design to stabilize the vault and prevent and isolate intrusions.

Building on the work performed by the technical task team, this project plan and the proposed project baseline were prepared to fulfill PI ORP3.3.1 and to recommend a path forward. To define the baselines (technical scope, schedule, and cost), the RPP TBR-package planning process was used. The TBR packages document the project activity logic, scope definition, and description; the detailed schedule; and the estimate of resources and their cost to complete the work.

To conduct the TBR-package planning process, multifunctional planning teams were formed with technically knowledgeable lead representatives and organizations responsible for performing the work. Organizations included Process Engineering; Nuclear Safety and Licensing; Operations; Technical Operations and Engineering; Business Management (scheduling and cost estimating); Environmental, Safety, Health, and Quality Assurance; and ORP. The team leads assigned had expertise in the type of work being planned to ensure that the work was properly scoped and scheduled. These planning teams also ensured that interfaces between performing organizations were identified for each activity and series of activities and that programs, projects, and operations work were integrated. Meetings were held with other RPP organizations and Site contractors to review potential work conflicts, resource integration, and required interfaces.

The planning teams were responsible for preparing all data contained in the TBR packages and schedule. The initial document prepared was the 244-CR Vault Interim Stabilization Project-level logic, which reflects the summary workscope and workflow for the Project (Section 6.3). Each activity on this logic represents a TBR package.

Once the project logic was completed, the work breakdown structure (WBS) for the Project was detailed (Section 6.2). All scope for this Project resides under the RPP WBS number 1.01.03, "Tank Farm Operation" (Project Baseline Summary [PBS]) TW03.

On the basis of the WBS and Project logic breakdowns, TBR packages then were prepared for each activity on the Project logic. TBR packages consist of the following:

- TBR control logs
- TBR narratives
- Primavera Project Planner™-(P3) generated subactivity logic networks
- Subactivity cost-estimating input sheets (CEIS)
- P3-generated resource and cost loading reports (pricing).

The TBR narratives were prepared first; these fully define and document the technical (scope) description, assumptions, references, risks, requirements, drivers, and interfaces for each activity on the Project logic.

Using the TBR narratives, the planning teams then broke down each TBR activity into subactivity (and subtask) levels to define the detailed scope, logic, and activities. The subactivities then were evaluated to determine predecessor and successor activities, durations, and logic ties.

On the basis of the detailed subactivity scope and logic and other available information, CEISs then were prepared to define and document the subactivity (and subtask) scope, resources, basis of estimate, and assumptions at an executable task level.

Using data from the TBR packages, the planning teams then developed a detailed, integrated schedule in P3. The detailed subactivity logic networks and CEISs were used initially to define the activities in the schedule and their logic and resource loading. Logic between TBR activities was developed as required.

The first draft schedule prepared was unconstrained. This schedule then was constrained where necessary, and adjusted for selected critical resource availability, and the results were evaluated. The project plan uses a plan start date of October 1, 2000, for cost estimating purposes. The final detailed schedule (Section 6.4) was reviewed to verify scope (activities), activity durations, logic, and resource loading. The final schedule is task oriented, logic driven, and resource loaded. It is traceable to the Project logic, WBS, activity owners (performing organizations), and TBR package data, including the detailed subactivity logic networks and CEISs.

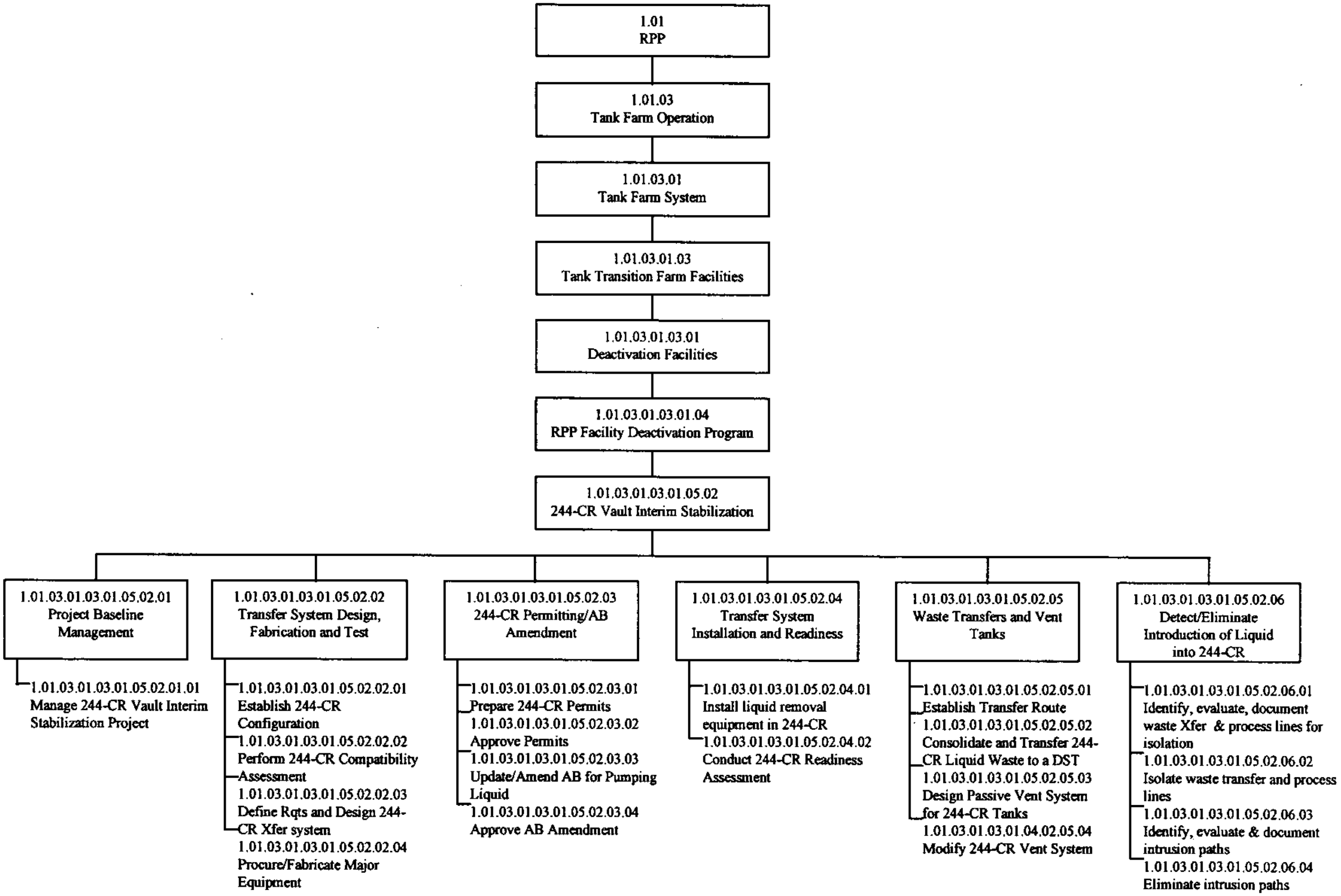
The Project costs and staffing profile (Section 6.5) were generated from the final schedule. Resources were priced in P3 in accordance with approved forward-pricing labor rates and adders.

Based on the final schedule, the TBR packages were reviewed and approved as Rev. 0 by management and the performing organizations. The P3 cost and resource reports are included in the TBR packages.

6.2 PROJECT WORK BREAKDOWN STRUCTURE

Figure 6-1 shows the 244-CR Vault Interim Stabilization Project WBS. This Project WBS reflects all proposed work required to complete the project as scoped. This Project resides under RPP WBS number 1.01.03, “Tank Farm Operation.”

Figure 6-1. 244-CR Vault Interim Stabilization Project Work Breakdown Structure.



The WBS is used as a framework for scope definition, scheduling, budgeting, and management of the work. Activities in the Project logic and TBR packages reside in this WBS. Table 6-1 provides a crosswalk of the WBS to the Project logic activities.

6.3 PROJECT LOGIC

Appendix C shows the Project-level logic for the 244-CR Vault Interim Stabilization Project (drawing number RPP-5876). Development of the Project logic translates the Project mission requirements discussed in Section 2.0 into a sequence of activities and workflow necessary to achieve the mission objectives. The Project logic reflects the scope of work necessary to complete the Project.

The Project-level logic is traceable to and supports the RPP Mission Logic Level 0 (drawing number TWR-2086), which represents the entire scope of work necessary to achieve the RPP life-cycle mission. Traceability is maintained from the Level 0 Logic box activity number 67, "Disposition Inactive Tank Facilities" through the breakdown of that activity (drawing number TWR-3981), to the 244-CR Vault Interim Stabilization Project-level logic by the use of consistent activity coding; box 67 becomes 670.DCZ at the next level.

The Project-level logic reflects an assumed flow of the remaining work in accordance with a typical program and project mission life cycle (Section 2.7). The logic activities start with development of an interim stabilization project plan and finish with lay-up of the transfer system on completion of the work. While the Project-level logic identifies the project activities, work flow, and general scope, this logic is not a schedule, and specific logic ties, timing, and durations should not be inferred. Furthermore, all logic ties are not reflected at this level. This information is contained in the P3 detailed schedule (Section 6.4).

Each activity on the Project-level logic represents a TBR package. The TBR packages were developed to document the scope, estimates, and schedule data at the appropriate subactivity level of detail. The TBR package data then was used to develop the detailed P3 schedule. This process provides for traceability from the detailed P3 schedule, through the TBR packages, to the Project-level logic and finally to the Level 0 logic.

6.4 PROJECT SCHEDULE

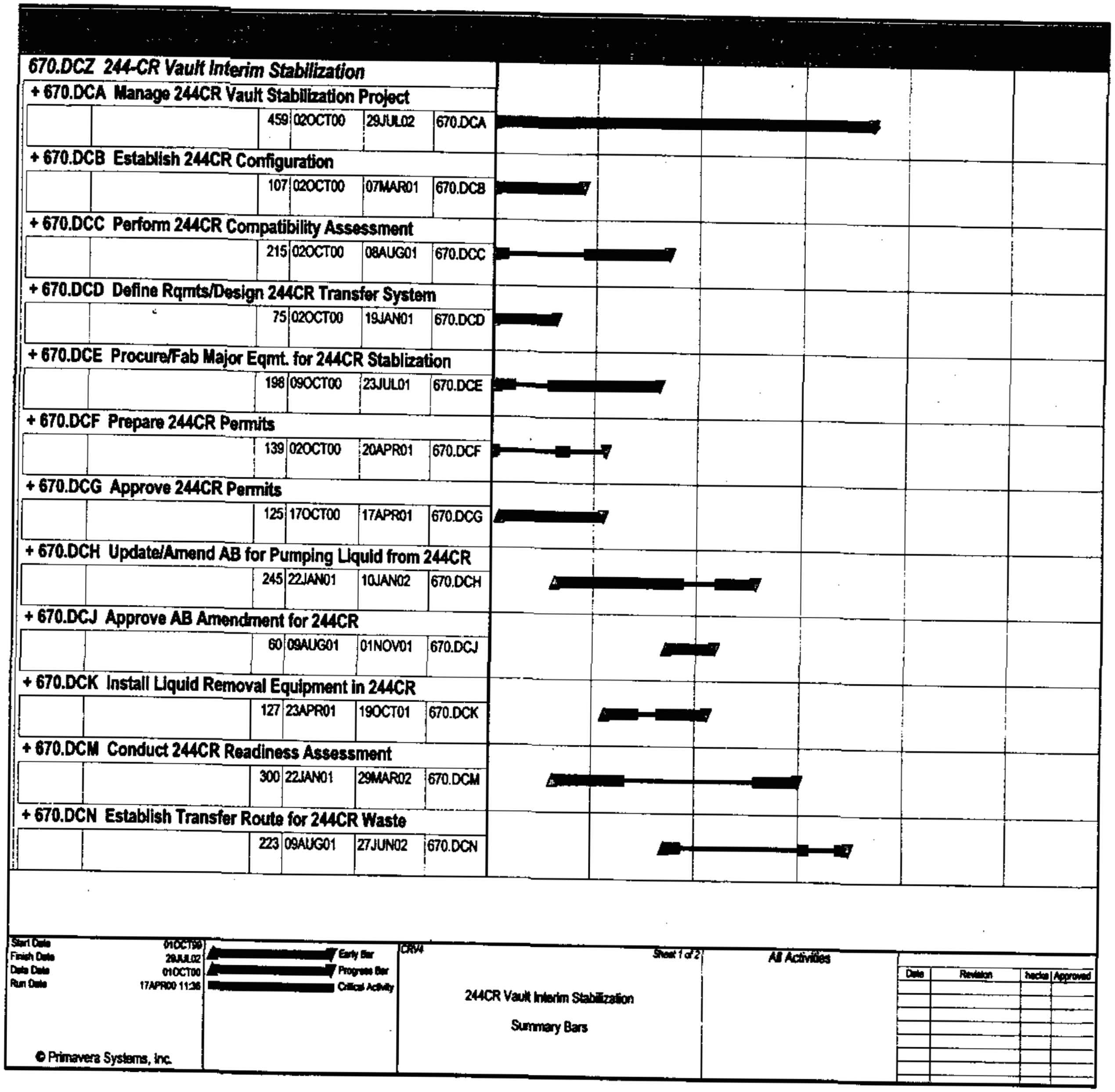
On the basis of the planning process described in Section 6.1, the proposed detailed schedule was prepared (Figure 6-2). The schedule is formatted by WBS and TBR package subactivity breakdown. The schedule was developed from and is traceable to the WBS, Project-level logic, and TBR package data. All work scope required to complete the Project is included in the schedule.

Table 6-1. 244-CR Vault Interim Stabilization Project Work Breakdown Structure/Level 1 Logic Crosswalk

WBS	WBS Title	Logic #	Logic Title
1.1.3.1.3.1.5.2.1	Manage 244-CR Vault Stabilization Project	670.DCA	Manage 244-CR vault interim stabilization project
1.1.3.1.3.1.5.2.2	Transfer System Design, Fabrication, and Test	670.DCB	Establish 244-CR configuration
		670.DCC	Perform 244-CR compatibility assessment
		670.DCD	Define requirements and design 244-CR transfer system
		670.DCE	Procure/Fabricate major equipment
1.1.3.1.3.1.5.2.3	244-CR Permitting / AB Amendment	670.DCF	Prepare 244-CR permits
		670.DCG	Approve permits
		670.DCH	Update/Amend AB for pumping liquid
		670.DCJ	Approve AB amendment
1.1.3.1.3.1.5.2.4	Transfer System Installation and Readiness	670.DCK	Install liquid removal equipment in 244-CR
		670.DCM	Conduct 244-CR readiness assessment
1.1.3.1.3.1.5.2.5	Waste Transfers and Vent Tank	670.DCN	Establish transfer route
		670.DCP	Consolidate and transfer 244-CR liquid waste to a DST
		670.DCR	Design passive vent system for 244-CR tanks
		670.DCS	Modify 244-CR vent system
1.1.3.1.3.1.5.2.6	Detect/Eliminate introduction of Liquid into 244-CR	670.DCT	Identify, evaluate, and document waste transfer and process lines for isolation
		670.DCU	Isolate waste transfer and process lines
		670.DCV	Identify, evaluate, and document intrusion paths
		670.DCW	Eliminate intrusion paths

AB = authorization basis
DST = double-shell tank

Figure 6-2. 244-CR Vault Interim Stabilization Project Schedule. (2 sheets)

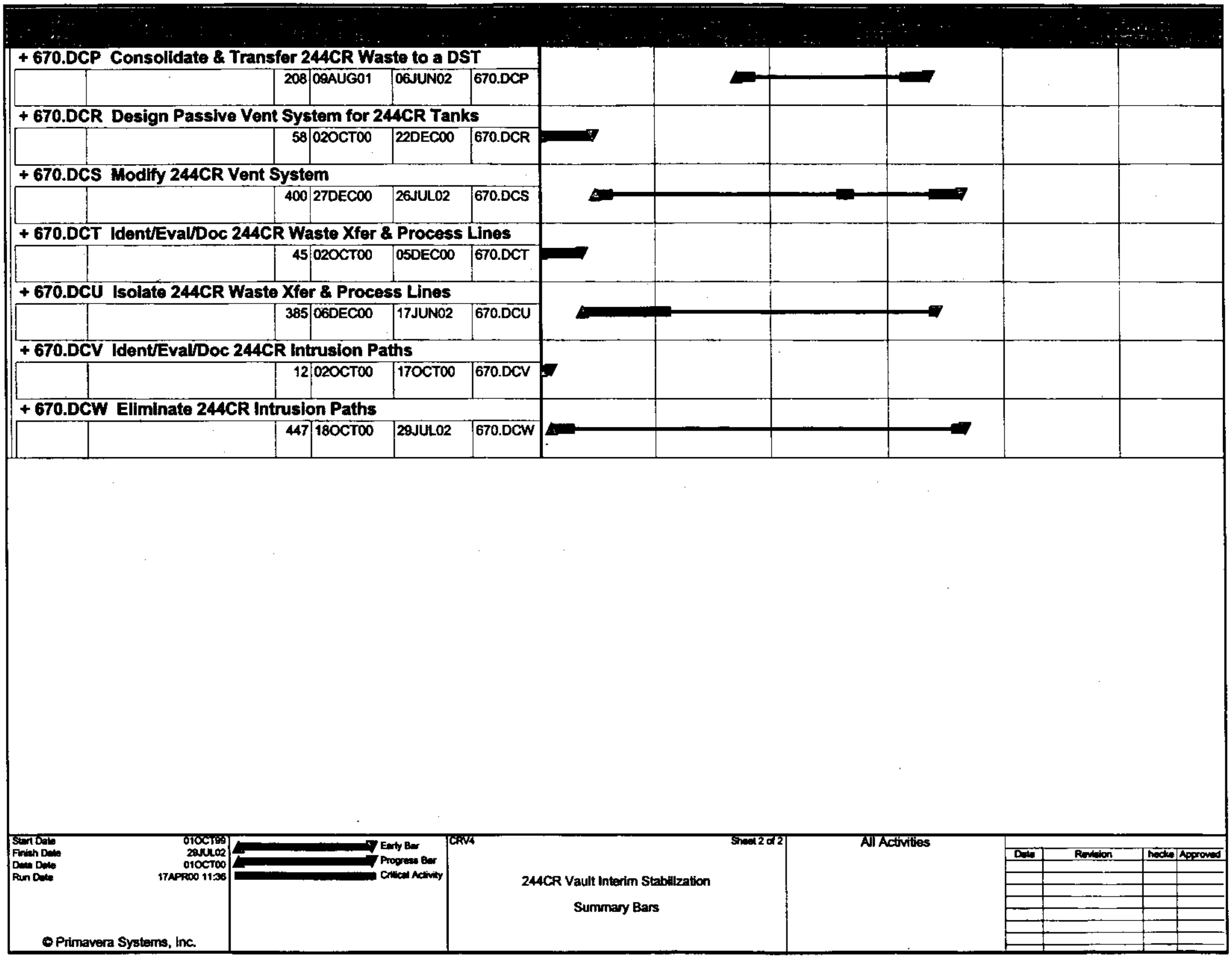


670.DCZ 244-CR Vault Interim Stabilization

+ 670.DCA Manage 244CR Vault Stabilization Project	459	02OCT00	29JUL02	670.DCA
+ 670.DCB Establish 244CR Configuration	107	02OCT00	07MAR01	670.DCB
+ 670.DCC Perform 244CR Compatibility Assessment	215	02OCT00	08AUG01	670.DCC
+ 670.DCD Define Rqmts/Design 244CR Transfer System	75	02OCT00	19JAN01	670.DCD
+ 670.DCE Procure/Fab Major Eqmt. for 244CR Stablization	198	09OCT00	23JUL01	670.DCE
+ 670.DCF Prepare 244CR Permits	139	02OCT00	20APR01	670.DCF
+ 670.DCG Approve 244CR Permits	125	17OCT00	17APR01	670.DCG
+ 670.DCH Update/Amend AB for Pumping Liquid from 244CR	245	22JAN01	10JAN02	670.DCH
+ 670.DCJ Approve AB Amendment for 244CR	60	09AUG01	01NOV01	670.DCJ
+ 670.DCK Install Liquid Removal Equipment in 244CR	127	23APR01	19OCT01	670.DCK
+ 670.DCM Conduct 244CR Readiness Assessment	300	22JAN01	29MAR02	670.DCM
+ 670.DCN Establish Transfer Route for 244CR Waste	223	09AUG01	27JUN02	670.DCN

Start Date	01OCT99
Finish Date	29JUL02
Data Date	01OCT00
Run Date	17APR00 11:36

Figure 6-2. 244-CR Vault Interim Stabilization Project Schedule. (2 sheets)



+ 670.DCP Consolidate & Transfer 244CR Waste to a DST

		208	09AUG01	06JUN02	670.DCP

+ 670.DCR Design Passive Vent System for 244CR Tanks

		58	02OCT00	22DEC00	670.DCR

+ 670.DCS Modify 244CR Vent System

		400	27DEC00	26JUL02	670.DCS

+ 670.DCT Ident/Eval/Doc 244CR Waste Xfer & Process Lines

		45	02OCT00	05DEC00	670.DCT

+ 670.DCU Isolate 244CR Waste Xfer & Process Lines

		385	06DEC00	17JUN02	670.DCU

+ 670.DCV Ident/Eval/Doc 244CR Intrusion Paths

		12	02OCT00	17OCT00	670.DCV

+ 670.DCW Eliminate 244CR Intrusion Paths

		447	18OCT00	29JUL02	670.DCW

Start Date	01OCT99
Finish Date	29JUL02
Data Date	01OCT00
Run Date	17APR00 11:36

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CRV4

Sheet 2 of 2

244CR Vault Interim Stabilization

Summary Bars

All Activities

Date	Revision	hecke	Approved

The schedule, prepared in P3, is task-oriented, logic-driven, and resource-loaded. Activities and resources from the detailed subactivity logic networks in the TBR package and CEISs were loaded and priced in this P3 schedule to produce the cost and full-time-equivalent (FTE) staffing summaries found in Section 6.5.

As discussed in Section 6.1, draft schedules were prepared during the TBR planning process. The schedule reflects a start date of October 1, 2000, for cost and schedule planning. The actual start date will be established once funding for the project has been authorized. Key Project schedule completion dates, using the start date of October 1, 2000, are as follows:

• Establish 244-CR Configuration	March 7, 2001
• Complete final design of transfer system	January 19, 2001
• ORP approval of the AB Amendment to pump liquids	November 1, 2001
• Install transfer system in 244-CR	October 19, 2001
• Complete Readiness Assessment	March 29, 2002
• Transfer liquids to a DST	June 6, 2002

The end date of the Project is July 29, 2002, as reflected in schedule activity number 67DAXA.

See Section 6.5.3 for the schedule risk analysis.

6.5 COST AND BASELINE ANALYSIS

6.5.1 Cost by Work Breakdown Structure

Table 6-2 summarizes the escalated costs by fiscal year and the estimate to complete the Project scope of work defined. Table 6-3 breaks down the unescalated costs by WBS for the activities contained and priced in the P3 detailed schedule.

Table 6-2. 244-CR Vault Interim Stabilization Project, Escalated Costs by Fiscal Year with October 1, 2000, Start Date ($000).

	FY 2001	FY 2002	FY 2003	Total
Total Cost (Unescalated)	2799.7	1092.8	0.0	3892.5
Total Escalation	64.4	52.5	0.0	116.9
Total Escalated Cost	2864.1	1145.3	0.0	4009.4

Table 6-3. 244-CR Vault Interim Stabilization Project, Cost by Work Breakdown Structure, Unescalated ($000).

WBS Number	WBS Description	Fiscal Year			Total
		2001	2002	2003	
1.01.03.01.03.01.05.02.01	**Project Baseline Management**				
1.01.03.01.03.01.05.02.01.01	Manage 244-CR Vault Interim Stabilization Project	124.7	103.4		228.8
1.01.03.01.03.01.05.02.02	**Transfer System Design, Fabrication, and Test**				
1.01.03.01.03.01.05.02.02.01	Establish 244-CR Configuration	550.1			550.1
1.01.03.01.03.01.05.02.02.02	Perform 244-CR Compatibility Assessment	320.5			320.5
1.01.03.01.03.01.05.02.02.03	Define Requirements and Design 244-CR Transfer System	207.7			207.7
1.01.03.01.03.01.05.02.02.04	Procure/Fabricate Major Equipment	438.0			438.0
1.01.03.01.03.01.05.02.03	**244-CR Permitting/AB Amendment**				
1.01.03.01.03.01.05.02.03.01	Prepare 244-CR Permits	10.6			10.6
1.01.03.01.03.01.05.02.03.02	Approve Permits	0.0			0.0
1.01.03.01.03.01.05.02.03.03	Update/Amend AB for Pumping Liquid	428.8	7.9		436.7
1.01.03.01.03.01.05.02.03.04	Approve AB Amendment	0.0			0.0
1.01.03.01.03.01.05.02.04	Transfer System Installation and Readiness				
1.01.03.01.03.01.05.02.04.01	Install Liquid Removal Equipment in 244-CR	307.3	47.4		354.7
1.01.03.01.03.01.05.02.04.02	Conduct 244-CR Readiness Assessment	67.7	327.1		394.8
1.01.03.01.03.01.05.02.05	**Waste Transfers and Vent Tanks**				
1.01.03.01.03.01.05.02.05.01	Establish Transfer Route	23.8	114.7		138.5
1.01.03.01.03.01.05.02.05.02	Consolidate & Transfer 244-CR Liquid Waste to a DST	12.7	156.5		169.2
1.01.03.01.03.01.05.02.05.03	Design Passive Vent System for 244-CR Tanks	88.1			88.1
1.01.03.01.03.01.05.02.05.04	Modify 244-CR Vent System	38.3	282.9		321.2
1.01.03.01.03.01.05.02.06	**Detect/Eliminate Introduction of Liquid into 244-CR**				
1.01.03.01.03.01.05.02.06.01	Identify, Evaluate, and Document Waste Transfer and Process Lines for Isolation	35.2			35.2
1.01.03.01.03.01.05.02.06.02	Isolate Waste Transfer and Process Lines	118.6	43.8		162.4
1.01.03.01.03.01.05.02.06.03	Identify, Evaluate, and Document Intrusion Paths	18.5			18.5
1.01.03.01.03.01.05.02.06.04	Eliminate Intrusion Paths	9.1	9.1		18.2
1.01.03.01.03.01.05.02	**244-CR Vault Interim Stabilization Project Total**	2799.7	1092.8	0.0	3892.5

The costs in Tables 6-2 and 6-3 are consistent with the detailed P3 schedule of activities and are supported by the TBR package data including the CEIS resources, budget quantities, and basis of estimate.

Pricing for the work was performed in the schedule by means of a P3 resource-rate library based on approved ORP guidance. The labor and non-labor rates in the library are fully burdened with the applicable adders except for escalation. The rate guidance is issued by FHI/ORP.

The Project costs have been escalated in accordance with the latest DOE and CHG guidance for FY 2000 multi-year work plan (MYWP) forward pricing. The escalation factors are effective starting in FY 2001, because the pricing rates are based on FY 2000 dollars. The annual and cumulative escalation factors used for FY 2001, FY 2002, and FY 2003 are 2.3%, 4.8%, and 7.4%.

See Section 6.5.3 for the cost risk analysis.

6.5.2 Labor Resources by Work Breakdown Structure

Table 6-4 summarizes the full-time-equivalent labor necessary to complete the Project scope of work as defined in the P3 detailed schedule. This table, generated in P3, is based on work-hour resource loading by Common Occupational Classification System and activity in the CEIS. The work hours are based on the realization calendar of 1,812 hours per year. The schedule is based on a 40-hour work week except for the waste-pumping activities, which require multiple shifts for a period of days.

Existing staff availability and ramp-up was evaluated as part of the TBR planning process and TBR approvals, which include verifying that the personnel resource loading and schedule are appropriate.

Table 6-4. 244-CR Vault Interim Stabilization Project, Full-Time Equivalents by Work Breakdown Structure. (2 sheets)

WBS Number	**WBS Description**	**Full Time Equivalents**		
		FY 2001	**FY 2002**	**FY 2003**
1.01.03.01.03.01.05.02.01	**Project Baseline Management**			
1.01.03.01.03.01.05.02.01.01	Manage 244-CR Vault Interim Stabilization Project	1.00	0.83	
1.01.03.01.03.01.05.02.02	**Transfer System Design, Fabrication, and Test**			
1.01.03.01.03.01.05.02.02.01	Establish 244-CR Configuration	4.03		
1.01.03.01.03.01.05.02.02.02	Perform 244-CR Compatibility Assessment	0.23		
1.01.03.01.03.01.05.02.02.03	Define Requirements and Design 244-CR Transfer System	0.62		
1.01.03.01.03.01.05.02.02.04	Procure/Fabricate Major Equipment	1.39		
1.01.03.01.03.01.05.02.03	**244-CR Permitting/AB Amendment**			
1.01.03.01.03.01.05.02.03.01	Prepare 244-CR Permits	0.09		

Table 6-4. 244-CR Vault Interim Stabilization Project, Full-Time Equivalents by Work Breakdown Structure. (2 sheets)

WBS Number	**WBS Description**	**Full Time Equivalents**		
		FY 2001	**FY 2002**	**FY 2003**
1.01.03.01.03.01.05.02.03.02	Approve Permits	0.00		
1.01.03.01.03.01.05.02.03.03	Update/Amend AB for Pumping Liquid	1.57	0.06	
1.01.03.01.03.01.05.02.03.04	Approve AB Amendment	0.00	0.00	
1.01.03.01.03.01.05.02.04	**Transfer System Installation and Readiness**			
1.01.03.01.03.01.05.02.04.01	Install Liquid Removal Equipment in 244-CR	2.17	0.34	
1.01.03.01.03.01.05.02.04.02	Conduct 244-CR Readiness Assessment	0.35	1.30	
1.01.03.01.03.01.05.02.05	**Waste Transfers and Vent Tanks**			
1.01.03.01.03.01.05.02.05.01	Establish Transfer Route	0.23	0.75	
1.01.03.01.03.01.05.02.05.02	Consolidate & Transfer 244-CR Liquid Waste to a DST	0.12	1.57	
1.01.03.01.03.01.05.02.05.03	Design Passive Vent System for 244-CR Tanks	0.36		
1.01.03.01.03.01.05.02.05.04	Modify 244-CR Vent System	0.37	2.05	
1.01.03.01.03.01.05.02.06	**Detect/Eliminate Introduction of Liquid into 244-CR**			
1.01.03.01.03.01.05.02.06.01	Identify, Evaluate, and Document Waste Transfer and Process Lines for Isolation	0.30		
1.01.03.01.03.01.05.02.06.02	Isolate Waste Transfer and Process Lines	0.94	0.25	
1.01.03.01.03.01.05.02.06.03	Identify, Evaluate, and Document Intrusion Paths	0.17		
1.01.03.01.03.01.05.02.06.04	Eliminate Intrusion Paths	0.09	0.07	
1.01.03.01.03.01.05.02	**244-CR Vault Interim Stabilization Project - Total Full time equivalents (FTES)**	**14.03**	**7.22**	**0.00**

DST = double-shell tank

6.5.3 Baseline Analysis

Cost and schedule analyses were performed to identify the total budget and schedule duration required to complete the planned 244-CR Vault Interim Stabilization Project workscope. Data input to the risk analyses included the cost and schedule data for planned activities and associated risks that result in potential effects on to the project.

These risks were analyzed to identify and quantify project risks and variability in the estimated cost and durations. The following discussion describes the process that was used to determine the cost and schedule effects of these uncertainties.

The risk analysis process involves capturing the variability on the budgeted and scheduled activities, as well as identifying the risks that are tied to enabling assumptions and other risks that could affect Project cost or schedule.

The risk-analysis process begins with a review of the scope and cost (time and money) defined by the TBR packages and associated detailed schedules. All activities then are categorized into one of two categories (I and II below), and risks (see Table 5-1) are put into Category III.

> Category I – Fixed- an activity that is certain to occur or that is certain to be required and for which cost or schedule and scope are firmly known.
>
> Category II – Variable- an activity that is certain to occur or that is certain to be required but whose costs and schedule or quantity vary over some finite range.
>
> Category III – Uncertain- an event that may or may not happen or an activity that is not planned but may be required; if such an event occurs, it carries a cost or schedule impact that varies over some finite range.

Technical leads, operational personnel, estimators, and others with knowledge of the TBR package discuss the technical aspects with a risk facilitator. The facilitator leads the group through the process and supports the leads in filling out the risk sections of the TBR and input forms for the risk analysis.

During this process, participants are encouraged to think of actions or events that could occur within the limits of the workscope that would either decrease or increase the cost or schedule of the work to be performed in the TBR. Furthermore, participants are asked to identify any risks outside the defined scope of the TBRs that they believe are reasonable issues warranting further risk analysis (i.e., potential category III). These items are added to the risk list, which represents the identified project risk as seen in Table 5-1.

The risk analysts incorporate distribution-estimating techniques to develop the cost and schedule profile of the work. The data identify the distribution of probable costs associated with each task. They are documented in terms of minimum, most likely, and maximum cost and schedule consequence ($000 or calendar days).

The analysis, which employs a Monte Carlo simulation, involves the assignment of random numbers to specific inputs in proportion to their consequence, drawing a sequence of random numbers and tabulating the associated outcomes. In this manner, a number of trials or a sequence of outcomes is generated that can be used to estimate the probabilities of expected values of a complex series of events.

The purpose of this simulation is to consider variation in the distribution of cost or schedule duration. The product of this analysis, known as an "S" curve, is first developed for all the "certain to occur" (Category I and II) items.

Because Category III items may or may not occur, additional data describing the likelihood of occurrence are required. As with data for Category I and II activities, this information represents a distribution of values. These data are added to the model, and a second curve is generated that includes Category I, II, and III (risk) data and represents the distribution of total cost and/or schedule. On the basis of this curve, budget or schedule (cost or completion dates) can be determined at selected probabilities.

The analyses are based on the assumption that all identified activities are performed to completion and thus produce distribution curves of probable final cost and completion date. Each point of these curves represents either a dollar or a time value with an associated probability that the final cost or completion date will not exceed that value. The project team selected the cost and completion date associated with the 80% probability point as the optimal value.

If the additional resource requirement identified from the "S" curve is determined to be too great or the additional risk is too high, mitigation actions can be developed and implemented to reduce the risk exposure. If such actions are approved, the costs associated with them are added to the Category I and II data (because they are then "certain to occur"), and the risk in the Category III data is either reduced or removed, on the basis of the calculated effectiveness of the mitigation action. During the analysis, risk mitigation plans were identified and, where feasible, added to the project plan, offsetting larger risk-exposure values.

The cost curve in Figure 6-3 represents the data for project-specific and project-variable cost (Categories I and II) and risk (Category III). This curve shows that the probability of success (where success is defined as completion of all identified tasks on-time and at-budget) based on the total Project budget of $3,892,500 (unescalated) is less than 80%.

To achieve an 80% probability of success, an additional amount of $111,000 must be added to the budget to pay for activities required when residual risks occur. This brings the total project cost to $4,003,400 (unescalated), as seen in Table 6-5.

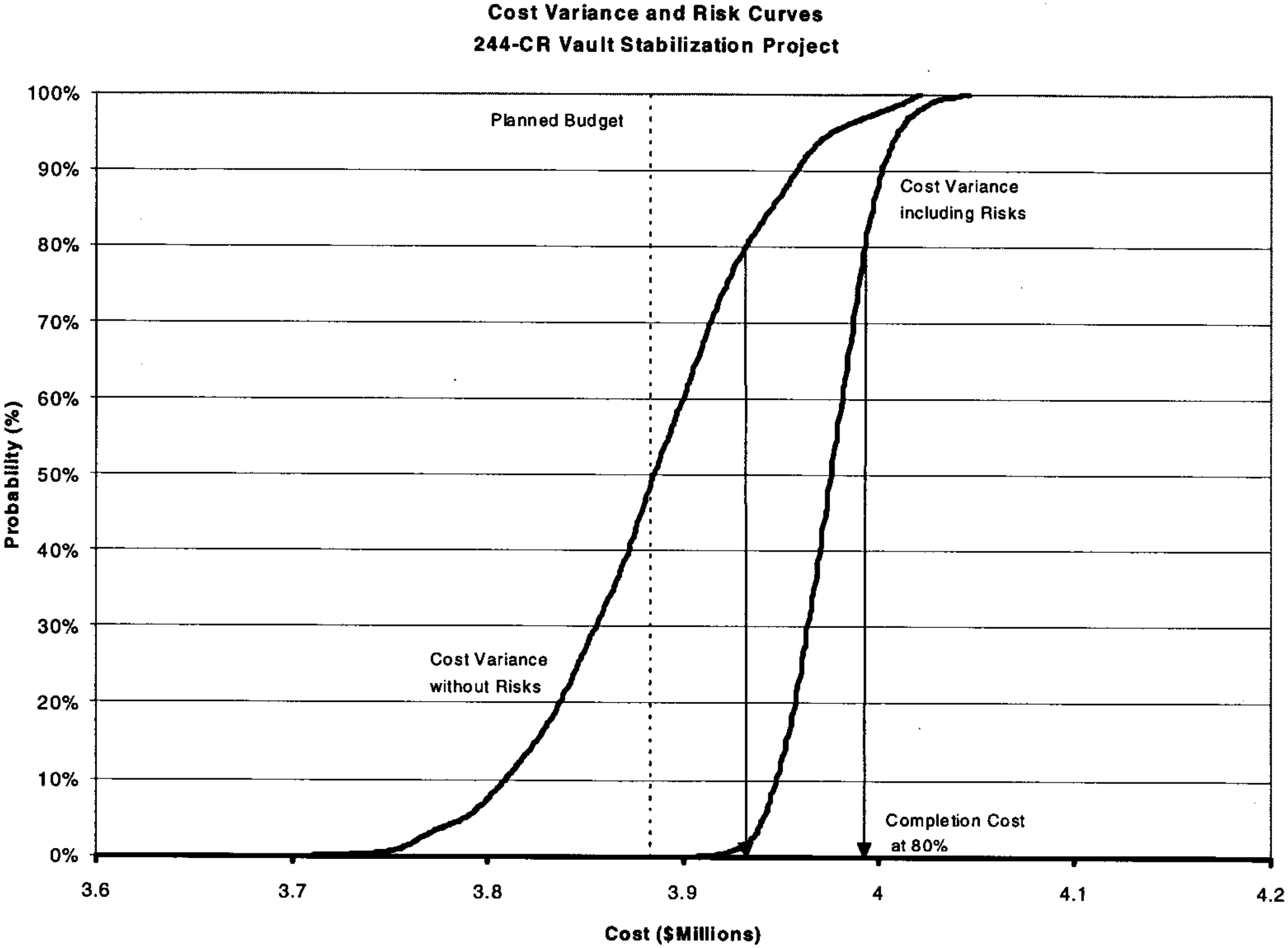
The total Project Plan budget including risk mitigation dollars and escalation is $4,123,200. This estimate comprises the total costs to complete the project, including costs for Operations activities, Technical Operations and Engineering activities, environmental permitting activities, AB support, installation, and risk mitigation

The baseline cost by fiscal year is shown in Table 6-5. This table identifies the cost variance and risk allowance by fiscal year.

Table 6-5. Escalated Costs by Fiscal Year Including Partial Risk Allowance ($000).

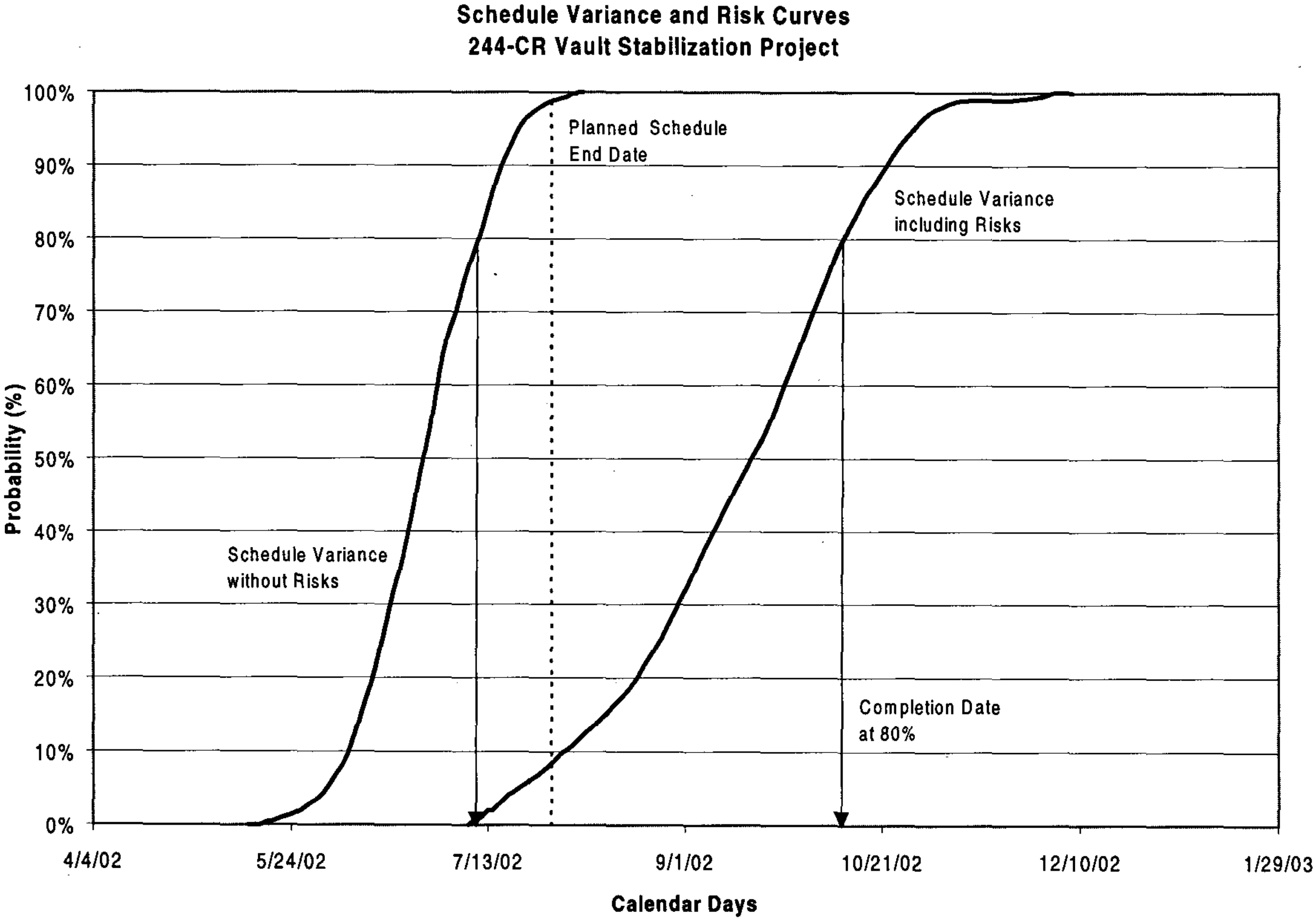
	FY 2001	**FY 2002**	**FY 2003**	**Total**
Total Cost Without Risk	2799.7	1092.8	0.0	3892.5
Cost Variation	41.0	8.9	0.0	49.9
Risk Allowance	38.7	22.3	0.0	61.0
Subtotal	2879.4	1124.0	0.0	4003.4
Escalation	66.2	53.6	0.0	119.8
Total Project Cost	2945.6	1177.6	0.0	4123.2

Figure 6-3. Category I, II, and III Risks Associated with Cost for Completion of Project.



Cost Variance and Risk Curves
244-CR Vault Stabilization Project

Figure 6-4. Category I, II, and III Risks Associated With Schedule.



Schedule Variance and Risk Curves
244-CR Vault Stabilization Project

The planned baseline schedule shows a Project duration of approximately 22 months (not including risk). When the data is analyzed in the Monte Carlo simulation, the "S" curve (Figure 6-4) shows that the completion of the Project by July 29, 2002, has a less than an 80% probability of success. An adjustment of approximately 2½ months was made to the schedule to bring the probability to 80%, adjusting the Project completion date to October 12, 2002.

6.6 PROCUREMENT ACTIVITIES

Procurement activities for the 244-CR Vault Interim Stabilization Project are included in the project schedule and cost estimate. They include major equipment, other necessary material and equipment, and contracts. Table 6-6 is a summary of the labor, material, and contracts costs.

Table 6-6. Labor, Materials, and Contracts Costs (unescalated) ($000).

	FY 2001	**FY 2002**	**FY 2003**	**Total**
Labor	1604.1	747.7	0.0	2351.8
Material	216.8	33.0	0.0	249.8
Contracts	453.4	167.0	0.0	620.4
Other	525.4	145.1	0.0	670.5
TOTAL	**2799.7**	**1092.8**	**0.0**	**3892.5**

7.0 TANK WASTE OPERATIONS

Tank Waste Operations manages and directs, in a safe and efficient manner, operations, characterization, maintenance, and radiological control of tank activities pertaining to RPP permitted treatment, storage, and disposal facilities (Figure 7-1). The organization is flexible, and a matrixed management approach is used to support individual projects such as the 244-CR Project. Tank Farm Facilities Operations (TFFO) and the 244-CR Project are key to the success of the ORP project mission. Other RPP organizations supporting this mission and associated management concepts, policies, and processes are discussed in Appendix B, "Management Approach."

7.1 TANK FARM FACILITIES OPERATIONS

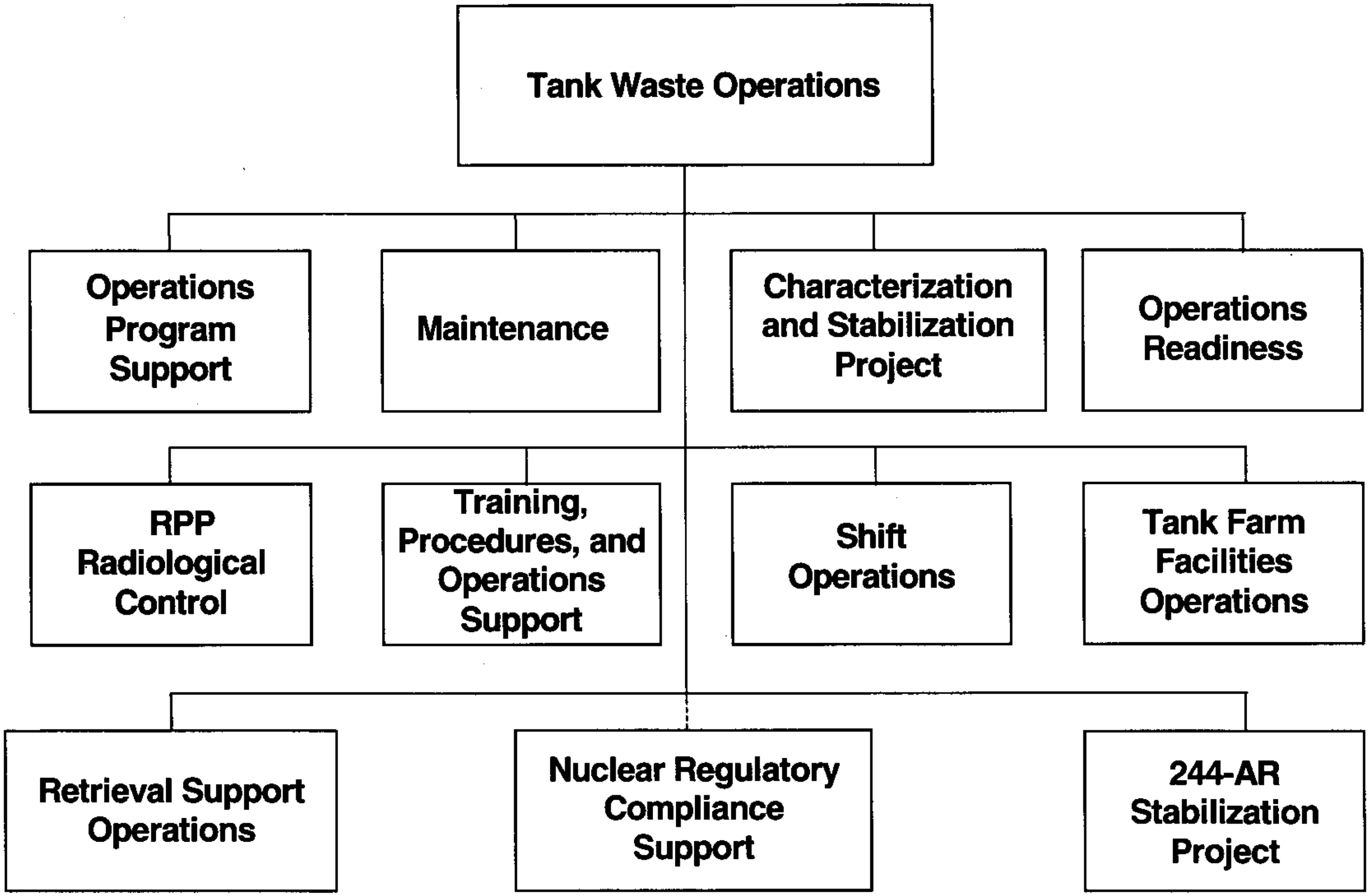
The TFFO is responsible for managing the 177 underground storage tanks (149 SSTs and 28 DSTs) in a safe and efficient manner that ensures compliance with DOE orders and federal, state, and local laws and regulations, and achieves the mission goals and objectives of DOE and ORP. The DST and SST shift managers are responsible for the safe execution of field activities. The shift managers report directly to the Shift Operations Manager, who in turn reports to the Vice President of Tank Waste Operations. A reporting structure is shown in Figure 7-2. Specifically, TFFO is responsible for the safe handling, separation, storage, and monitoring of highly radioactive liquid waste stored in the underground tanks.

The TFFO maintains a standard of performance for formal conduct of operations, maintenance, and radiological control by its personnel in accordance with the approved tank farm standards and requirements identification documents. Surveillance activities necessary to support the safe-storage mission, including the 244-CR Project, are performed to approved procedures. Specific responsibilities include the operations required to retrieve and transfer waste.

7.2 POST-STABILIZATION OPERATIONS

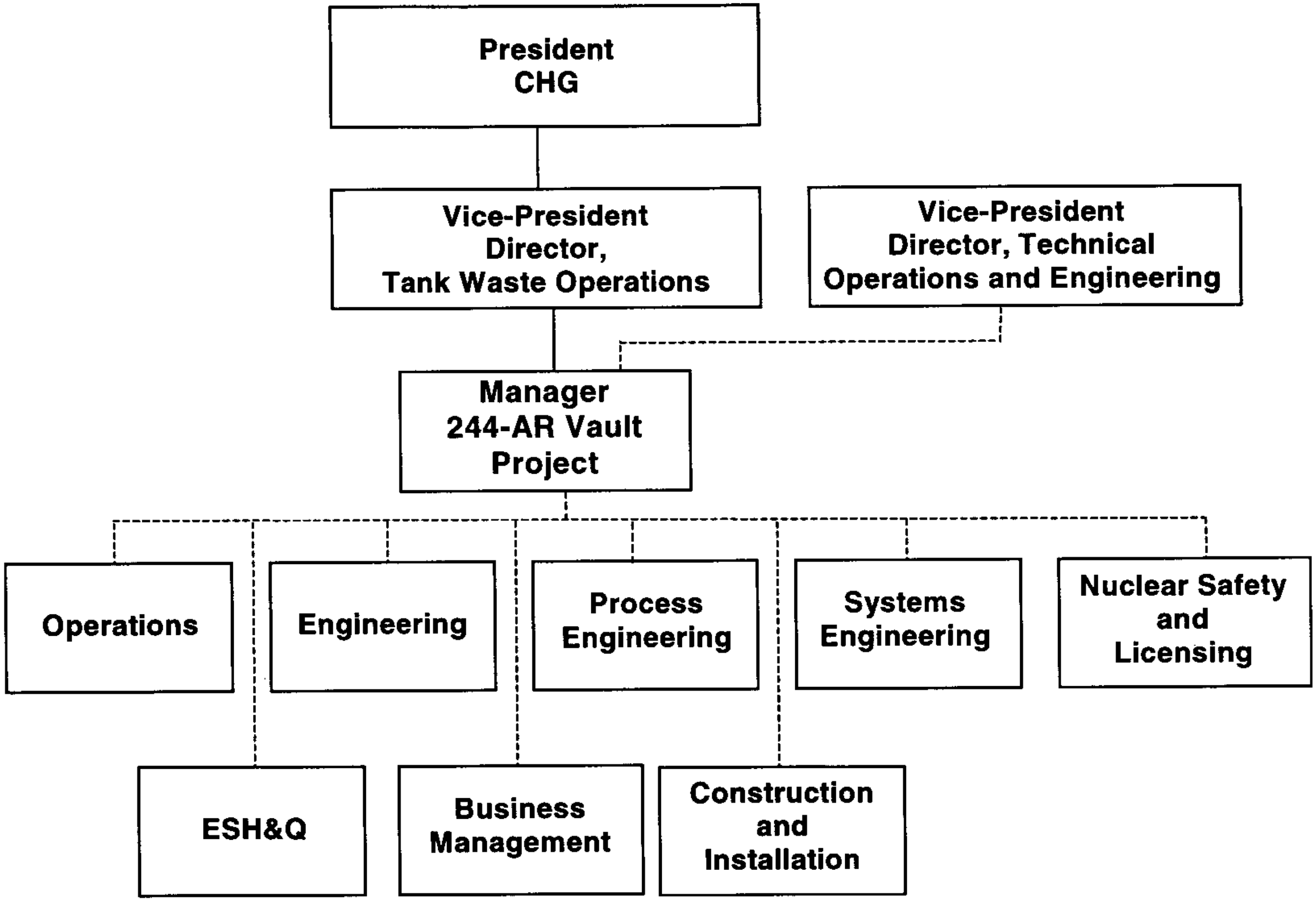
After the pumping operations are completed, the pumping system will be isolated and laid up. Pumps, level detectors, and associated hardware will be left in place for future use, if required, in accordance with the performance requirements of PI ORP 3.3.1. All lines will be flushed before lay-up. The aboveground transfer line used to transfer liquids from the tanks and the sumps to tank CR-003 will be removed and stored for future use. The jumper used in diversion box 153-ER for the transfers to the DSTs will be removed to isolate the 244-CR vault, and the jumper configuration in 244-A will be restored for operations.

Figure 7-1. Tank Waste Operations Organization Chart.



RPP = River Protection Project.

Figure 7-2. 244-CR Vault Interim Stabilization Project Reporting Structure.



CHG = CH2M HILL Hanford Group, Inc.
ESH&Q = Environment, Safety, Health and Quality.

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APPENDIX A

REQUIREMENT MATRIX

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APPENDIX A
REQUIREMENT MATRIX

The 244-CR Vault Interim Stabilization Project Requirement Matrix was developed to guide the project team during the planning and design phase. Requirements were established to provide a measurable level for success and quantified endpoint criteria for the successful completion of the project. The column titled "Action to Meet the Requirement" contains a brief summary of the action and the measurable requirement for the action. The column titled "Deliverable" includes the specific action required to document completion.

Requirement	Source	Action to Meet the Requirement	Deliverable
Remove pumpable liquids from 244-CR vault tanks.	PI ORP 3.3.1	Tanks CR-002, CR-003. Reduce liquids to a level equivalent to or better than the capability of the original pumps. * Estimated at 2702 L (714 gal).	Transfer summary sheet with video verification of waste level.
		Tanks CR-001, CR-011. Reduce liquids to a level equivalent to or better than the capability of the original pumps. * Estimated at 6881 L (1818 gal).	Transfer summary sheet with video verification of waste level.
Remove pumpable liquids from the vault itself and it's associated sumps.	PI ORP 3.3.1	Remove liquids, if present, to a volume less than the capacity of the sump. (This volume would include any backflush water for flushing the pump.) Sump 1, 11: = 204 L (54 gal) Sump 2, 3: = 193 L (51 gal)	Transfer summary sheet with video or level detector readings.
Isolate 244-CR vault	PI ORP 3.3.1	For all process liquids and waste transfer lines connecting to the facility, place a mechanical isolation in/on the line at the supply end and/or on the 244-CR vault end of the piping segment entering the vault.	Matrix listing lines, type and location of isolation, with closed-out work packages verifying installations.
Provide for the removal of pumpable liquids that may accumulate in the future	PI ORP 3.3.1	*Leave pumping system in place and connected with* exception of the temporary equipment (e.g. air supply, water supply, portable exhausters), and the aboveground jumper.	Provide drawings and *specification for* reconnection and preparation for operation of the system.
Install intrusion-prevention mechanism as may be necessary.	PI ORP 3.3.1	Mechanically seal or block all identified intrusion routes. Methods may include vault covers, foam, grout, cement, process blank, etc. For some components, such as buried vaults and concrete piping encasements, a white paper may be created for specific concerns such as seepage.	Matrix listing all identified intrusion paths, listing type and location of intrusion prevention or evaluation document number with closed-out work packages verifying installation.

Requirement	Source	Action to Meet the Requirement	Deliverable
Establish periodic liquid level monitoring systems for intrusion detection before final closure.	PI ORP 3.3.1	Provide instrumentation to detect a liquid intrusion in each of the four sumps, capable of detecting any intrusion that would exceed the capacity of the sumps, with quarterly readings.	Verify that monitoring is in place and operational in the four sumps. (calibrated).

* The target quantities for liquids remaining in the tanks after pumping will depend on several factors. These factors will influence the design of the pump intake as well as the volume of liquid remaining in the tanks. Because of the cooling coil configuration in tanks CR-002 and CR-003 and the assumption that the long-length equipment located inside the cooling coils is not being removed as a part of the stabilization, access to the volume of waste in the dished bottom of the tank will be limited. During the early stages of the project under the "Establish Configuration" work, the specific gravity of the waste and the solids level, if higher than the level that can be assessed from the outside of the cooling rings, will be determined. Target volumes for liquid remaining in the tanks should be established on completion of the "Establish Configuration" work, before the initiation of design.

APPENDIX B

MANAGEMENT APPROACH

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APPENDIX B
MANAGEMENT APPROACH

Control and execution of the work scope included in the project baseline is aided by a structured management approach. This appendix summarizes the management concepts, policies, and processes used by the River Protection Project (RPP) organization and the Project team, including business management, engineering, the Integrated Safety Management System, decision management, risk management, configuration management, interface management and communication management.

B1.0 BUSINESS MANAGEMENT

Business management includes those principal activities necessary to establish and maintain the 244-CR Vault Interim Stabilization Project baseline. These activities include planning for, and providing input to, the mission scope and providing for schedule development, cost estimating, acquisition management, and performance monitoring.

B1.1 PROJECT BASELINE DEVELOPMENT

The integrated baseline development process is described in Section 6.0. The physical breakdown configuration, operational requirements, and technical requirements drive the work breakdown structure (WBS) (see Section 6.2), work definition, project logic, the supporting critical-path analyses, and baseline schedules. Once the work is defined, detailed schedules are developed and activities are resource loaded. Adjustments then are made to level the resources and meet the schedule and budget constraints imposed on the Project. The final scope, schedule, and the supporting cost estimates constitute the 244-CR Vault Interim Stabilization Project baseline.

B1.2 WORK SCOPE MANAGEMENT

Work scope management for the 244-CR Vault Interim Stabilization Project is performed through project logic (Section 6.3). This logic is an enhanced program evaluation and review technique chart that depicts, in a box and line format, the major activities, their relationships and dependencies, as well as predecessor and successor activities. The logic is derived from the Level 0 logic for the RPP and is maintained in a computer-based project-planning system (Primavera Project Planner[1] or P3). Input to and modification of the P3 database are subject to configuration control, ensuring that the 244-CR Vault Interim Stabilization Project work cannot be altered without appropriate approval.

Activities in the 244-CR Vault Interim Stabilization Project logic are broken down into sets of logically linked tasks. These tasks are defined at a sufficiently low level to support defensible

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[1] Primavera Project Planner is a trademark of Primavera Systems, Inc.

analyses of the duration and cost of each task. Technical basis review (TBR) packages are generated at this level. The TBR packages provide background summaries and identify enabling assumptions, responsible organizations, technical contacts for activities, interfaces and linkages to other activities, predecessor and successor activities, risks, and other information necessary to describe the essential attributes of each activity and its supporting tasks.

B1.3 SCHEDULE MANAGEMENT

The schedule for the 244-CR Vault Interim Stabilization Project is managed by integrating the detailed work schedules identified in the programmatic TBR packages. The work schedules are reviewed and adapted as needed to ensure consistency with programmatic direction. In addition, the 244-CR Vault Interim Stabilization Project schedules are aligned with the WBS and are subsequently integrated in the RPP multi-year work plan (MYWP).

B1.4 COST MANAGEMENT

Cost management for the 244-CR Vault Interim Stabilization Project will ensure that cost estimates are based on current plans or actual work performance and that the basis for cost estimates is consistent with the documented project scope and schedule baselines. Periodic reviews will be conducted on the financial status, and variance reports will be prepared. On the basis of reviews of these reports, responsible management will identify workarounds or other actions that may be required to eliminate variances or mitigate the effects of such variances.

B1.5 WORK AUTHORIZATION

Work authorization for the 244-CR Vault Interim Stabilization Project is authorized by an operation directive. The appropriate operation direction is approved by the CH2M HILL Hanford Group, Inc. (CHG), financial officer and the responsible Project Baseline Summary director.

B1.6 SUBCONTRACTING

Subcontracting for the 244-CR Vault Interim Stabilization Project occurs when offsite support is needed to accomplish required work. Task orders, specifications, statement of work, and/or acceptance criteria are developed to request subcontract work. This information is processed through the CHG Contracts organization for placement.

B1.7 PERFORMANCE MEASUREMENT AND REPORTING

Performance measures are developed at all management levels and are aimed at achieving optimal performance in cost, schedule, quality, and workforce productivity. Performance is measured against the plan, and all variances are monitored and controlled. Recovery plans are developed by the responsible manager for variances that exceed identified threshold tolerances. Responsible managers will monitor performance of internal support-service personnel and resolve deficiencies with the appropriate support service managers. The responsible managers also have the authority to reject costs erroneously charged to their work accounts. Table B-1 identifies the minimum levels of performance reporting for the 244-CR Vault Interim Stabilization Project.

Table B-1. Minimum Levels of Performance Reporting.

Work Breakdown Structure Reporting Level	Cost-Account Manager	Project Manager	CHG Management
Project Baseline Summary	√	√	√
Activity	√	√	√
Cost Account	√	√	√
Work Package	√		
Task	√		

Performance measures are reflected each month and are based on the actual costs and performance reported in the financial system. Performance also is measured through the use of numerous metrics including, but not limited to, budget/performance/cost profile and full-time equivalent plan-versus-use profile.

B1.8 CONTINUOUS PROCESS IMPROVEMENT

The 244-CR Vault Interim Stabilization Project Team is committed to the principle of continuous process improvement.

B1.9 MANAGEMENT SYSTEMS

The following sections describe systems and tools for information resource management and decision modeling use by the 244-CR Vault Interim Stabilization Project. Other key systems and processors are described in the remainder of Appendix B.

B1.9.1 Information-Resource-Management Systems

Much of the success of the 244-CR Vault Interim Stabilization Project management approach will rely on the ability to acquire and analyze budget information, cost information, and schedule information, and to use the Hanford Data Integrator 2000 System (HANDI 2000). The core business processes that HANDI 2000 will address are project management; financial management; supply management; and human resources, environmental, safety, and work management.

B1.9.2 Management Tools

The 244-CR Vault Interim Stabilization Project uses management tools to assist in decision making. The most popular of these are the scheduling and resource-planning tools for project planning, particularly the P3 application, which produces schedules with logic ties defining interdependence of the activities. This tool ensures that the resources are available to perform required work.

B2.0 ENGINEERING

The engineering process applied to the 244-CR Vault Interim Stabilization Project uses a systems approach. This process ensures that the technical baseline supports the identified problem needs and requirements. In this process the requirements are determined; the system is assessed; the existing technical baseline is verified; new hardware is designed, constructed/procured, installed and tested; existing hardware is checked, updated, and tested; and operations and maintenance are supported.

The engineering approach takes into account any modifications and maintenance to support the existing 244-CR vault that may be under way. The existing system and any ongoing activities are being assessed to ensure that they will perform the required functions and meet performance requirements. The systems focus on developing the functions, requirements, concepts, and integration of activities, whereas the engineering focus is on the existing technical baseline/system, design/construct/test, and operations and maintenance support.

B2.1 SYSTEMS ENGINEERING

Systems engineering is the fundamental tool for understanding and developing complex or first-of-a-kind systems throughout their life cycle. The systems engineering process is described in HNF-SD-WM-SEMP-002, Rev. 1 (Peck 1998), and in implementing procedures contained in HNF-IP-0842 (CHG 2000); it ensures that the technical baseline is defensible and integrated. This process has been implemented on the 244-CR Vault Interim Stabilization Project.

B2.2 ENGINEERING PROCESS

The engineering process is documented in HNF-IP-0842, Volume IV (CHG 2000). This plan describes the engineering process and the controls being put in place to support the technical baseline definition and to manage its control, evolution, and implementation.

B3.0 INTEGRATED SAFETY MANAGEMENT SYSTEM

The objective of the Integrated Safety Management System (ISMS) is to facilitate safe work. The RPP organization is committed to performing work safely and efficiently and in a manner that ensures protection of the workers, the public, and the environment. Management of safety functions and activities is an integral aspect of RPP and is accomplished through the integration of safety management into all facets of work planning and execution. The ISMS establishes one Environmental, Safety, and Health Management System that integrates requirements into work planning and execution and identifies requirements reflecting DOE's commitment to a "standards-based" safety program and safety concepts.

The ISMS provides the mechanism for increased worker involvement in work planning (including the identification of hazards and environmental impacts), analysis and control, and feedback/improvement processes. Effective implementation of the ISMS incorporates the best practices of, and supports the accomplishment of, the Voluntary Protection Program (VPP), the enhanced work planning/ Hanford Site occupational health process, and other similar environmental, safety, and health improvement initiatives.

HNF-1883, Section 9.3 (Freeman 1998), provides additional detail on ISMS objectives and the roles and responsibilities of the integrated organizations supporting this effort. The following sections summarize the details and describe their relevance to the 244-CR Vault Interim Stabilization Project activities.

The Environmental, Safety, Health, and Quality Assurance (ESH&Q); Radiological Control; Technical Operations and Engineering; and Nuclear Safety and Licensing organizations provide health and safety services to RPP. These organizations use the ISMS to integrate safety and health functions into work planning, execution, and follow-up. Programs are in place to oversee implementation of DOE Orders and federal, state, and local laws and regulations; perform audits to verify compliance with regulatory and legal operational requirements; and provide guidance and policy direction for continuous improvement in the conduct of work.

B3.1 ENVIRONMENTAL, SAFETY, HEALTH AND QUALITY ASSURANCE

- **Environmental**. The Environmental Program facilitates RPP compliance by definition and oversight of the environmental regulatory requirements. HNF-1773 (Borneman 1998) provides details on the Environmental Program processes, roles, and responsibilities. The 244-CR Vault Interim Stabilization Project activities are managed in accordance with HNF-1773.

- **Safety and Health**. The RPP Safety Program is a multidisciplined organization encompassing Industrial Safety, Industrial Hygiene, and Fire Protection. The Safety Program is implemented through numerous policies and procedures for Occupational Safety and Health and Fire Protection: HNF-SD-WM-HSP-002 (Mickle 1995); HNF-IP-0842, Volume IX, Section 1.1 (CHG 2000); and RPP specific administrative and quality procedures. The 244-CR Vault Interim Stabilization Project activities use these procedures. Safety is integrated through the work planning process and the safety oversight function.

- **Quality Assurance**. The "quality" management system for this activity is designed to achieve project control and meet DOE and ORP quality requirements as specified in Title 10 of the Code of Federal Regulations (CFR), Part 830, *Nuclear Safety Management*, Subpart A, General Provisions, Section 830.120, Quality Assurance Requirements (10 CFR 830.120).

The quality assurance policies and requirements are described in HNF-IP-0842, Volume XI, Sec. 1.1 (CHG 2000). This RPP Quality Assurance Program Description includes an "Implementation Matrix" defining implementation of the requirements addressed by DOE Order 414.1 and 10 CFR 830.120.

The Quality Assurance Program Plan is reviewed/revised annually to accommodate changes in requirements, activities, organization, or facilities. The 244-CR Vault Interim Stabilization Project activities fall under the Quality Assurance Program Plan and subordinate procedures.

B3.1.1 Emergency Preparedness

The Emergency Preparedness Program is an integral element of the ISMS; the program is described in RPP-PRO-424. The RPP Emergency Preparedness organization works in conjunction with the Sitewide Emergency Preparedness organization, which includes ORP and RPP team subcontractors. The RPP Project facility-specific requirements are identified and implemented by RPP Emergency Preparedness. The 244-CR Vault Interim Stabilization Project activities fall under the oversight of RPP Emergency Preparedness; these activities are covered by the current hazards assessment.

B3.1.2 Radiological Control

The Radiological Control Organization integrates safety and health functions into all phases of the RPP Project. The *Hanford Site Radiological Control Manual* (HSRCM-1, 1994) outlines the compliance program for 10 CFR 835, "Occupational Radiation Protection." The Radiological Control Organization implements this program through support and oversight of RPP project work, including the 244-CR Vault Interim Stabilization Project activities. This effort involves the generation of radiation work permits for relevant work and the assignment of radiological control technicians as appropriate.

B3.1.3 RPP Nuclear Safety and Licensing

For the RPP Project, the nuclear safety authorization basis is developed and maintained by the Nuclear Safety and Licensing organization, reporting to the Technical Operations and Engineering director. This functional support group ensures consistency across all aspects of the ORP Project in terms of hazard identification; control development; safety structures, systems, and components identification specifications; authorization basis document preparation;

associated DOE Order compliance; and approaches to dealing with technical uncertainty. The 244-CR Vault Interim Stabilization Project activities are evaluated for compliance with the authorization basis and other requirements through applicable ORP procedures.

B4.0 DECISION MANAGEMENT

Decision management provides traceability for making or changing decisions through the graded use of rigorous and methodical decision-making process. The 244-CR Project Management will implement the requirements of HNF-IP-0842, Volume X, Section 2.2, "RPP Systems Engineering Management Policy" (LMHC 1999); HNF-SD-WM-SEMP-002, *Tank Waste Remediation System Engineering Management Plan (*Peck 1998); and HNF-IP-0842, Volume IV, Section 2.7, "Decision Management" (LMHC 1999).

A graded approach to implementing this process is allowed for decisions of lesser impact. It is the responsibility of the designated decision maker to determine the degree to which the full decision-management process is applied to individual decisions. In such cases, 244-CR Project management will refer to HNF-IP-0842, Volume IV, Section 2.7, "Decision Management" (LMHC 1999), for specific guidance. At this time, no major decisions affect the 244-CR Project.

B5.0 RISK MANAGEMENT

The 244-CR Project has implemented a disciplined approach to project risk management to ensure that risks are identified and managed in a manner that eliminates or satisfactorily mitigates their impact. Risk-evaluation activities are embedded in the 244-CR Project Management processes and constitute a fundamental input to decision-making processes.

The ORP risk-management process is intended to reduce these risks to an acceptable level through risk assessment, analysis, and handling. Risks are intended to be communicated to the appropriate decision makers. The 244-CR Project risk management process is based on the requirements of HNF-IP-0842, Volume X, Section 2.2, "RPP Systems Engineering Management Policy" (LMHC 1999), and HNF-SD-WM-SEMP-002, *Tank Waste Remediation Systems Engineering Management Plan* (Peck 1998). These requirements cover risk assessment, risk analysis, and risk handling.

The 244-CR Project will implement these requirements through HNF-IP-0842, Volume IV, Section 2.6, "Risk Management" (LMHC 1999). In response to this guidance, the 244-CR Project will perform the following.

- Identify and analyze potential technical, schedule, and cost risks for activities.
- Develop and maintain risk-management lists identifying the risks, their possible consequences, a measure of their relative importance, and the planned mitigation actions.
- Control and track completion of assigned risk-management mitigation activities.

- Communicate risk projects status through rollup to the appropriate management levels and cross communication with the appropriate client counterpart at each level.

The 244-CR Project TBR documentation (see Section 6.1) and the 244-CR Project Risk Management List (see Section 6.5) are the principal management tools used to identify, analyze, and track project risks and their related issues. TBR documents are developed for each key activity identified on the 244-CR Project Logic in Appendix C and incorporate an assessment of technical, schedule, and cost risks relating to that activity. Risk management lists are use to compile, communicate, and track risks and actions taken to mitigate such risks.

B6.0 CONFIGURATION MANAGEMENT

Configuration management is an integral approach to controlling the technical, cost, schedule, and administrative information necessary to manage the 244-CR Project activities. It supports management of the 244-CR Project baseline by providing the mechanisms to identify, document, and control the functional and physical characteristics of the 244-CR Project products, particularly as changes are being made.

Configuration management focuses on six principal functions: configuration management, system management, configuration identification, configuration status accounting, change control, and configuration management assessments. Application of these functions is tailored to project requirements objectives to identify configuration items and configuration information to be controlled for each item and to control that information. Critical to this process is identification of the as-built configuration of project structures, systems, and components; the change-control thresholds for modifying this configuration; and the level of authority required for such changes.

The ORP configuration management policy and requirements are defined and described in HNF-1900, *Tank Waste Remediation System Configuration Management Plan* (Vann et al. 1998). The implementation process and mechanism used to establish and maintain configuration control are also described in HNF-1900. Specific mechanisms and requirements are addressed in detail by ORP procedures.

Tank Waste Operations has appointed a Tank Farm Facilities Operations configuration management representative who is responsible for identifying configuration items and configuration information, including the data in the ORP configuration program, and maintaining their traceability and consistency with source requirements. This effort covers the configuration management requirements for all activities with the Tank Farm Facilities Operations including those of the 244-CR Project.

B7.0 INTERFACE MANAGEMENT AND CONTROL

A major objective of interface management and control is to form agreements that allow organizations to design adjoining physical systems. Proper application of interface management and control processes results in structures, systems, and components that physically fit and function together without mismatch, omission, or interferences. Interface management and control also must be imposed when an organization interface is identified. Typically, the interfaces identified are with other internal ORP projects (e.g., Retrieval and Disposal, Tank Farm Facilities Operations, Interim Stabilization) or to external projects (e.g., Waste Management Project).

The requirement that project interfaces be identified, controlled, and integrated with other projects and activities is found in HNF-SD-WM-SEMP-002, *TWRS Systems Engineering Management Plan* (Peck 1998), and HNF-IP-0842, Volume IV, Section 2.8, "Interface Control" (LMHC 1999). The 244-CR Project will establish formal agreements with the performing organization, as needed. Performance against interface requirements will be monitored. The key interfaces affecting the 244-CR Project are addressed in Section 2.4.

Management of these interfaces is coordinated through the conduct of monthly, at minimum, meetings with the affected parties. The purpose of these meetings is to provide information on activities to all affected organizations, to discuss issues and conflicts, and to resolve any interface problems that may arise.

B8.0 COMMUNICATION MANAGEMENT

Project team meetings are the principal means of day-to-day communication for the 244-CR Project. Project activities are statused, issues are discussed, and action assignments are recorded and tracked. Project participants and representatives from ORP routinely attend and participate in these meetings.

Other forms of communication include the availability of electronic data, documentation, and briefings. Electronic communication is used extensively via the Hanford Local Area Network share drives. In addition, briefings to contractor senior management, DOE, ORP and the Washington State Department of Ecology are provided on an as-needed basis.

B9.0 REFERENCES

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APPENDIX C

244-CR LOGIC

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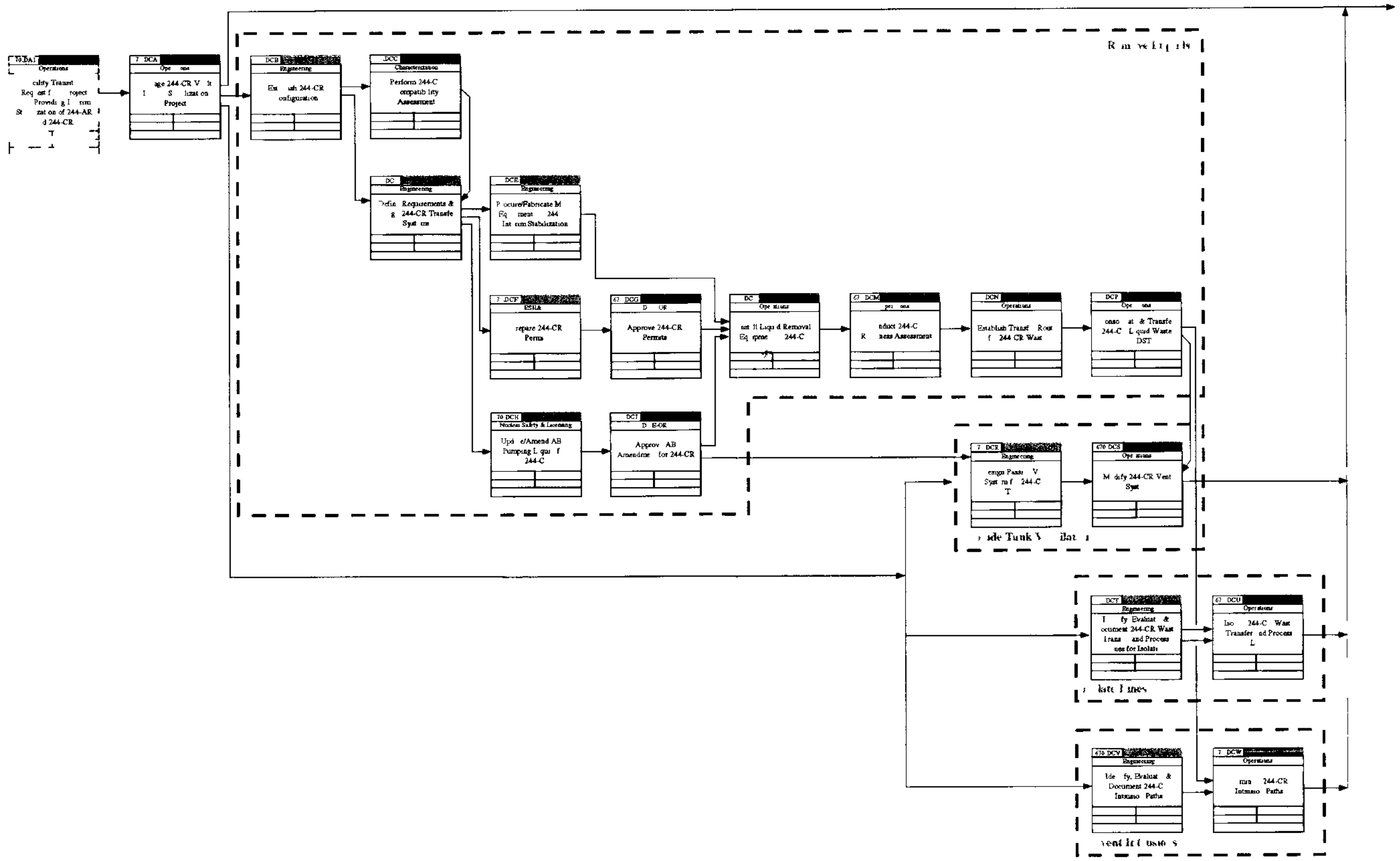
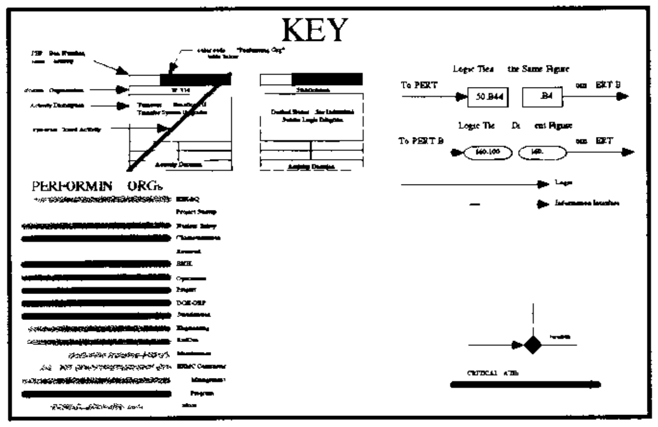
670.DCZ Perform 244-CR Vault
Interım Stabilization

NOTES

1 AB = Authorization Basis
DST = Double Shell Tank





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CH2MHILL HANFORD GROUP

670.DCZ Perfor 244-CR Vault Interım Stabıl zatıon

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