U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

MAR 2 5 2008

08-TOD-027

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

Dear Ms. Hedges:

CONTRACT NO. DE-AC27-99RL14047 – SUBMITTAL OF RPP-9937, REVISION 3 TO SINGLE-SHELL TANK SYSTEM LEAK DETECTION AND MONITORING FUNCTIONS AND REQUIREMENT DOCUMENT

The U.S. Department of Energy, Office of River Protection (ORP) submitted RPP-9937, Revision 0, to Washington State Department of Ecology (Ecology) for approval in accordance with Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestone M-23-23 in December 2002 and it was finalized in January 2003 pursuant to the provisions of HFFACO, Section 9.2. ORP submitted RPP-9937, Revision 1, to Ecology in December 2004 and it was approved in February 2005. Revision 2 was submitted to Ecology in February 2005 and approved in April 2005. Revision 3 (Enclosure 1) has been reviewed by ORP staff. Pursuant to HFFACO, Section 9.2, the revision must be submitted to Ecology for approval. The revision will not be implemented until the approval criteria of Section 9.2 are met. The transmittal contains two enclosures:

Enclosure 1: RPP-9937, *Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document,* Revision 3

Enclosure 2: Ecology Review Comment Record (RCR)

If you have any questions, please contact me, or your staff may contact John Long, Tank Farms Programs and Project Division, (509) 376-5416.

Sincerely,

Shirley J. Olinger, Manager
Office of River Protection

TOD:JDL

Enclosures (2)

cc: See page 2

cc w/encl:
J. J. Lyon, Ecology

cc w/o encl:
S. Harris, CTUIR
S. L. Leckband, HAB
G. Bohnee, NPT
K. Niles, ODOE
A. Conklin, WDOH
J. Martell, WDOH
R. Jim, YN
Administrative Record
CH2M HILL Correspondence
Environmental Portal, LMSI

08-TOD-027

Enclosure 1

RPP-9937, SINGLE SHELL TANK SYSTEM LEAK DETECTION AND MONITORING FUNCTIONS AND REQUIREMENTS DOCUMENT, REVISION 3

Consisting of 188 pages including coversheet

CH2M HILL DOCUMENT RELEASE FORM

(1) Document Number: RPP-9937		(2) Revision Number: 3	(3) Effective Date: NA
(4) Document Type:	☐ Digital Image ☒ Hard copy ☐ PDF ☐ Video	(a) Number of pages (including the DRF) or number of digital images	
(5) Release Type	☐ New ☐ Cancel	☐ Page Change	☒ Complete Revision
(6) Document Title:	Single - Shell Tank System Leak Detection and Monitoring Functions and Requirments Document		
(7) Change/Release Description:	RPP-9937 was revised to correct gramatical errors and provide updated information.		
(8) Change Justification:	The changes to the Hanford Federal Facility Agreement and Consent Order (TPA) primary documents are needed to support updated information regarding Leak Detection and Monitoring Functions. Reference: USQ :TF-07-1959-S Rev. 0)		

(9) Associated Structure, System, and Component (SSC) and Building Number:		
	(a) Structure Location: N/A	(c) Building Number: N/A
	(b) System Designator: N/A	(d) Equipment ID Number (EIN): N/A

(10) Impacted Documents:	(a) Document Type	(b) Document Number	(c) Document Revision
	Operating Specification Document	OSD-T-151-00031	G-2

(11) Approvals:

(a) Author (Print/Sign): P.C. Miller	Date: 2/6/08
(b) Responsible Manager (Print/Sign): M.N. Jaraysi	Date: 2/8/08
(c) Reviewer (Optional, Print/Sign): D.G. Baide	Date: 2-5-08
(d) Reviewer (Optional, Print/Sign): L.S. Krogsrud	Date: 1/9/08

(12) Distribution:

(a) Name	(b) MSIN	(a) Name	(b) MSIN	Release Stamp
P.C. Miller	R1-51			
M.N. Jaraysi	H6-03			
D.A. Barnes	R1-14			
D.B Baide	S7-24			
L.S. Krogsrud	S7-24			

(13) Clearance	(a) Cleared for Public Release ☐ Yes ☐ No	(b) Restricted Information? ☐ Yes ☐ No	(c) Restriction Type:

(14) Clearance Review (Print/Sign): Date:

A-6003-881 (05/05)

Tank Farm Contractor (TFC) **RECORD OF REVISION**	(1) Document Number: **RPP-9937**	Page 1

(2) Title:

Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document

Change Control Record

(3) Revision	(4) Description of Change – Replace, Add, and Delete Pages	Authorized for Release	
		(5) Resp. Engr. (print/sign/date)	(6) Resp. Mgr. (print/sign/date)
1	Clarify the intent of the executive summary table in RPP-9937, and reduce the frequency of the single shell tank farm inspections from daily to weekly for SST tanks undergoing a retrieval process per ECN – 722241 RO.	L.S. Krogsrud	M.J. Sutey
2	• Changes "weekly" monitoring to "quarterly" monitoring for tanks with <50,000 gallons drainable interstitial liquid or <5,000 gallons supernate. Three tanks will be on quarterly monitoring (A-103, BY-103, BY-104). • Maintains all tanks with >40,000 gallons, <50,000 gallons drainable interstitial liquid and <5,000 gallons of supernate without complete intrusion prevention on a weekly monitoring frequency. Deletes reference to this tanks as being subject to intrusion. • Deletes the Executive Summary. Descriptive portion of the Executive Summary has been moved to appropriate sections in the body of the F%R. The tables in the Executive Summary have been deleted as they are, at best, a snapshot in time. • Updates the waste transferred to the DST as a result of Interim Stabilization. • Reflects the completion of the 244-AR stabilization effort and milestone. • Reflects the update to the knowledge of conditions at 244-CR vault. • Deletes 5 catch tanks that are listed as DST components. • Updates flowcharts to reflect waste retrievals. • Deleted waste volumes in the various tank and structure catagories as it changes with each retrieval. • Deleted number of tanks in each category on the flowcharts and descriptive section due to numbers changing as waste retrievals advance changing as waste retrievals advance. • Update tables in Appendix B to reflect correct group assignments for structures and tanks. • Update table in Appendix B to reflect tanks with LOWs installed. • Added a requirement that, if analysis of surveillance data indicates that a tank may be experiencing an intrusion event, that tank will be changed from annual to quarterly monitoring.	P.C. Miller	M.N. Jaraysi

Tank Farm Contractor (TFC) **RECORD OF REVISION**	(1) Document Number: **RPP-9937**	Page 2

Change Control Record

(3) Revision	(4) Description of Change – Replace, Add, and Delete Pages	Authorized for Release	
		(5) Resp. Engr. (print/sign/date)	(6) Resp. Mgr. (print/sign/date)
3	Page Number and Change 1-2 Added description of Table 1-1 1-2 through 1-11 Added Table 1-1 1-12 Changed "Mitigate the effects of the leak..." to "Contain the leak" 1-13 Deleted "or contained in the Double Shell Tank System" 1-13 Added "or retrieval" in the second paragraph 3-1 Changed "seven" to "17" in third bullet 3-1 Added "or retrieval" in the second paragraph 3-3 Changed "17" to "18" in seventh bullet 3-5 Added "with the exception of 241-AX Tank Farm" to the first paragraph 3-9 Deleted "No additional confirmation or declaration of leakers has occurred since 1994." 3-9 Changed "seven" to "seventeen" in 3.1.2 4-3, 4-4 Added "or steel" to Section 3.1.3 4-7, 4-8, 4-9 Font change for "Figure 4-2, 4-3, 4-4" 4-10 Revised Figures 4-4, 4-3, 4-4 by deleting specific reference to tanks and number of tanks 4-10 Font change for "Figure 4-2" 4-12 Requirement 3, added requirements concerning detected intrusion 4-11 Requirement B.2, deleted reference to three MUSTS 4-12 Added "were included in the Inactive Miscellaneous Underground Tank (IMUST), or that were not placed in service and did not receive dangerous waste" for 244-U 4-12 Font change "Figure 4-4" 4-13 Modified basis to include information, modified sentence to state there are no mission essential MUSTs 5-1 Modified basis to include information	P.C. Miller	M.N. Jaraysi

Change Control Record

(3) Revision	(4) Description of Change – Replace, Add, and Delete Pages	Authorized for Release	
		(5) Resp. Engr. (print/sign/date)	(6) Resp. Mgr. (print/sign/date)
	5-2 Deleted "Some" from second paragraph 5-2 Deleted Food Instrument Corporation Gauge information 5-4 Added "on an as needed basis" to photographic inspection 5-4 Deleted BY-106 and S-112 from Section 5.1.3 5-4 Section 5.2.1 changed "2.67" to "2.89" 5-4 Split first paragraph in Section 5.2.1 into two paragraphs. 5-5 Added "(Refer to Table B-3)" to second paragraph of Section 5.2.1 5-5 Corrected typo in line 5 of first paragraph 5-5 Added "(Refer to Table B-4)" to first paragraph 5-5 Added "(Refer to Table B-5)" to second paragraph 5-5 Added "(Refer to Table B-6)" to third paragraph 5-5 Added requirements concerning detected intrusion 5-5 Deleted "scheduled" from visual photographic inspection 5-6 Added "on an as needed basis" to photographic inspection 5-6 Section 5.2.2, changed to reflect tanks transferred from DST to SST system 5-6 Section 5.2.3, deleted reference to a third group of MUSTs as that grouping no longer exists 7-1 Section 5.2.3, changed the number of vessels and cells A-2, A-3, A-4, A-5 Revised references A-5 Revised monitoring status for several tanks A-6 Deleted redundant MUST list A-6, A-7 Moved 241-AR-151, 241-AX-155, and 241-S-09A to Inactive/Not-In-Use Components table A-7 Moved tanks, pits, and transfer lines from the "active" list to the inactive list		

Change Control Record

(3) Revision	(4) Description of Change – Replace, Add, and Delete Pages	Authorized for Release	
		(5) Resp. Engr. (print/sign/date)	(6) Resp. Mgr. (print/sign/date)
	A-8 Deleted 241-U-09B and 241-U-11A from Mission Essential Components At-Tank Pits as both are listed on the Inactive/Not-In-Use Components table A-8 Added 241-AX-151-CT and 244-U to the Miscellaneous Underground Storage Tank for consistency with the SST Part A Revision 9 A-8 Modified the monitoring status of vessels A-9 Added tanks transferred from the DST System to the SST System A-10 through A-16 Moved 241-AR-151 and 241-AX-155 to Inactive/Not-In-Use Components table A-13 Added inactive pits, deleted incorrect nomenclature A-33 Moved 241-S-09A to Inactive/Not-In-Use Components table A-43 through 45 Added inactive transfer lines B-iii Added 120 transfer lines to the Inactive/Not-In-Use Component table for consistency with the SST Part A Revision 9 B-1 Added tables B-4 Deleted "significantly" from first line of paragraph 2 B-4 Deleted Table B-1. All subsequent tables re-numbered. B-4 Deleted reference to C-106 B-4 Modified volume of SST System B-5 Updated HNF-EP-0182 revision number B-5 Revised reference B-5 Deleted reference to specific volume B-6, B-7 Revised intrusion prevention statement in 5th paragraph B-8, B-9, B-10, B-11, B-12, B-13 Revised C-106 information B-10 Deleted "Dry surface", added information to blank comment blocks B-14 through B-25 Table B-1, Changed C-201 and C-204 to "ENRAF" from "MT"		

Change Control Record

(3) Revision	(4) Description of Change – Replace, Add, and Delete Pages	Authorized for Release	
		(5) Resp. Engr. (print/sign/date)	(6) Resp. Mgr. (print/sign/date)
	B-15 Table B-3, added bold highlight to F&R group monitoring frequency B-19 Added requirements concerning detected intrusion, revised the number of MUSTs, deleted "and are not physically isolated" B-25 Deleted "in accordance with the emergency pumping plan", revised the number of MUSTs B-26 Revised Table B-3 to list the six SSTs requiring LDM B-26, B-27 Revised Table B-4 to reflect no tanks in the group B-27 Added "intrusion prevention has been completed" B-27, B-28 Revised Table B-5 to add tanks B-28 Revised Table B-6 to add tanks B-28 Deleted section concerning MUSTs requiring level assessment. The assessments have been completed. B-29 Revised Table B-7 by adding tanks B-29 Revised Table B-8 by adding tanks and ion exchange column B-29 Deleted reference to a third group of MUSTs as group no longer exists B-29 Added 244-U to Table 8 B-29 Added Note 2 to Table B-8 concerning 244-U B-30 Added Table 9 listing 241-AX-151-CT and 241-BY-ITS2 Tank 2 B-32 Deleted Table B-11 as group no longer exists Revised references		

Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document

P.C. Miller
CH2M HILL Hanford Group, Inc.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-99RL14047

EDT/ECN:	UC:
Cost Center:	Charge Code:
B&R Code:	Total Pages:

Key Words: Leak Detection, Monitoring, SST, Single Shell Tank, Inspection, Frequency.

Abstract: This F&R applies to pre and post retrieval. This revision (revision 3) changes the frequency of monitoring from "weekly" to "quarterly". It also changes some information regarding waste tanks that has become new knowledge since the last revision (revision 2) of this document.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: Document Control Services, P.O. Box 950, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Release Approval | Date | Release Stamp

Approved For Public Release

CONTENTS

1.0 INTRODUCTION 1-1
1.1 PURPOSE AND SCOPE 1-1
1.2 INTEGRATION AND COORDINATION 1-16
1.3 OVERVIEW OF THE SINGLE-SHELL TANK SYSTEM 1-16

2.0 SINGLE-SHELL TANK SYSTEM REGULATIONS 2-1
2.1 STATE AND FEDERAL REGULATIONS 2-1
2.2 REQUIREMENTS FROM THE *HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER* 2-13

3.0 SINGLE-SHELL TANK SYSTEM COMPONENT DESCRIPTIONS AND LEAK DETECTION STATUS 3-1
3.1 SINGLE-SHELL TANK SYSTEM COMPONENT GROUPINGS 3-3
3.1.1 Single-Shell Tanks 3-5
3.1.2 Miscellaneous Underground Storage Tanks 3-9
3.1.3 At-Tank Pits 3-9
3.1.4 Between-Tank Pits 3-10
3.1.5 Piping 3-11
3.1.6 Miscellaneous Structures 3-11

4.0 LEAK DETECTION AND MONITORING FUNCTIONS AND REQUIREMENTS . 4-1
4.1 CONTROL SINGLE-SHELL TANK SYSTEM PRIMARY CONTAINMENT LEAKS 4-10
4.1.1 Detect Primary Containment Leaks in the Single-Shell Tank System 4-10
4.1.2 Contain Primary Containment Leaks in the Single-Shell Tank System 4-13
4.1.3 Respond to Primary Containment Leaks in the Single-Shell Tank System 4-15
4.2 CONTROL SINGLE-SHELL TANK SYSTEM TRANSFER COMPONENT LEAKS 4-17
4.2.1 Detect Waste Leakage within At-Tank Pits and Between-Tank Pits 4-17
4.2.2 Contain Waste Leakage within At-Tank Pits and Between-Tank Pits 4-18
4.2.3 Respond to Waste Leakage in At-Tank Pits and Between-Tank Pits 4-18
4.2.4 Detect Leaks in Single-Shell Tank System Piping 4-19
4.2.5 Contain Waste Leakage within Piping Secondary Containment 4-20
4.2.6 Respond to Leakage in Single-Shell Tank System Transfer Piping 4-20
4.3 INSPECTIONS AND EVALUATIONS OF THE SINGLE-SHELL TANK SYSTEM 4-21
4.3.1 Assess System Integrity 4-21
4.3.2 Perform Single-Shell Tank System Inspections 4-21
4.3.3 Corrective Maintenance 4-23
4.4 DESIGN AND CONSTRUCTION 4-24

5.0 CURRENT SINGLE-SHELL TANK SYSTEM MONITORING 5-1

5.1 CURRENT SINGLE-SHELL TANK SYSTEM LEAK DETECTION AND MONITORING 5-1
5.1.1 In-Tank Leak Detection 5-1
5.1.2 Monitoring in Single-Shell Tank Ancillary Systems 5-2
5.1.3 Interim Stabilization 5-4
Interim Stabilization of the Single-Shell Tanks has been completed with the exception of 241-S-102 which is currently in retrieval mode 5-4
5.2 BEST MANAGEMENT PRACTICE MONITORING 5-4
5.2.2 Miscellaneous Underground Storage Tanks 5-5
5.2.3 Vessels and Cells in Miscellaneous Structures 5-5

6.0 CHANGE CONTROL 6-1

7.0 REFERENCES 7-1

APPENDICES

Appendix A: List of Single-Shell Tank System Components Relating to Leak Detection and Monitoring

Appendix B: Rationale and Justification for Implementing Requirements and Best Management Practices

Appendix C: Cost Analysis

Appendix D: Schedule Analysis

FIGURES

Figure 1-1. River Protection Project Management System Document Hierarchy 1-16
Figure 1-2. Location of Single-Shell Tanks and Double-Shell Tanks at the Hanford Site 1-17
Figure 1-3. Cross-Sectional Views of Hanford Site Single-Shell Tanks 1-18
Figure 3-1. Tank Waste in a Single-Shell Tank 3-2
Figure 3-2. Relational Diagram of Single-Shell Tank System Components 3-4
Figure 3-3. Single-Shell Tank Cross-Section 3-5
Figure 4-1. Single-Shell Tank System Components–Functions and Requirements 4-6
Figure 4-2. Single-Shell Tank Leak Detection and Monitoring Requirements 4-7
Figure 4-3. Miscellaneous Underground Storage Tank Leak Detection and Monitoring Requirements 4-8
Figure 4-4. Miscellaneous Structure Leak Detection and Monitoring Requirements 4-9

TABLES

Table 1-1. Single-Shell Tank System Leak Detection and Monitoring Requirements
Table 2-1. Washington State Regulations (2 Sheets) 2-1
Table 2-2. Containment and Detection of Releases (7 Sheets) 2-3
Table 2-3. Inspections 2-10
Table 2-4. Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems (2 Sheets) 2-11
Table 2-5. Milestone M-23-23 2-13
Table 2-6. Milestone M-23-24 (3 Sheets) 2-14
Table 3-1. Single-Shell Tank Component Groupings 3-3
Table 3-2. Single-Shell Tank Leak Volume Estimates (3 Sheets) 3-6
Table 4-1. Component Groups and Requirements (3 Sheets) 4-3

This page intentionally left blank.

ABBREVIATION AND ACRONYM LIST

API	American Petroleum Institute
BMP	best management practice
CFR	*Code of Federal Regulations*
DL	drainable liquid
DOE	U.S. Department of Energy
DST	double-shell tank
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
F&Rs	functions and requirements
FIC	Food Instrument Corporation
HFFACO	*Hanford Federal Facility Agreement and Consent Order*
IQRPE	independent, qualified, registered, professional engineer
IS	interim stabilization
LDM	leak detection and monitoring
LOW	liquid observation well
MT	manual tape
MUST	miscellaneous underground storage tank
ORP	Office of River Protection
PUREX	plutonium-uranium extraction
RCRA	*Resource Conservation and Recovery Act of 1976*
REDOX	reduction-oxidation process
RPP	RCRA Past Practice
RPP	River Protection Project
SST	single-shell tank
STI	Steel Tank Institute
TSD	treatment, storage, and disposal
WAC	*Washington Administrative Code*

DEFINITIONS

Drainable Liquid: The amount of supernate liquid and interstitial liquid available to gravity drain from a tank in the event of a leak.

Inactive/Not-in-use: A component with no current and no expected mission in safe storage or transfer of single-shell tank system waste. Inactive/not-in-use components may and do contain waste.

In Use: A component actively transferring waste, or physically connected to a system actively transferring waste.

Interim Stabilization: The process of removing pumpable supernate liquid and interstitial liquid from the single-shell tank system.

Interim Stabilization Criteria: The content limits that a tank must achieve to be declared interim stabilized. To be declared interim stabilized, single-shell tanks must contain less than 50,000 gallons of drainable interstitial liquid, and contain less than 5,000 gallons of supernatant liquid. To be declared interim stabilized, non single-shell tanks must contain 400 gallons or less of liquid, or have a liquid heel of 4 inches or less at either the tank bottom or sludge-to-supernate interface, or contain less than 5,000 gallons of liquid if transport regulations preclude transporting the tank waste by tanker truck (HNF-IP-0842, Volume 4, Section 4.1, Rev. 3c). Revision 2 of this document removed the jet pumping requirement from the Interim Stabilization Criteria.

Interim Status: A provision of the *Resource Conservation and Recovery Act of 1976* that grants a facility the right to continue to operate (treat, store, or dispose of hazardous waste) in accordance with applicable *Resource Conservation and Recovery Act of 1976* or state regulations until issuance of a *Resource Conservation and Recovery Act of 1976* permit.

Interstitial Liquid: The liquid in a waste matrix contained within the pore spaces of salts and sludge, some of which can gravity drain and the rest of which cannot drain due to capillary action.

Intrusion: The inadvertent introduction of water or liquid waste into a tank that commingles with waste and affects the total amount of drainable liquid in the tank.

Mission Essential: Those systems, components, and structures where it would be typical for waste to be moved in and out of the system to meet a current or expected mission.

Mixed Waste: Waste that contains both hazardous waste, as defined by the *Resource Conservation and Recovery Act of 1976* and its amendments, and radioactive waste, as defined by the *Atomic Energy Act of 1954* and its amendments.

Pumpable: Drainable supernate and interstitial liquid minus unpumpable supernate and interstitial liquid. Liquid in a single-shell tank is considered pumpable if it has a pumping flow rate greater than 0.05 gpm.

Supernate: Free liquid waste.

Unpumpable: Liquid held in the pore spaces of salts and sludge by capillary action that existing tank farm pumping systems cannot remove from a tank.

Vessel: For the purposes of this document, a tank, column, cell or similar component in a building structure that by design or practice may store waste.

This page intentionally left blank.

1.0 INTRODUCTION

The Hanford Site single-shell tank (SST) system consists of underground tanks and ancillary equipment built between 1943 and 1964. The SST system received radioactive and chemical process waste generated by defense activities that began at the site in 1944. Although the SST system no longer receives process waste, it continues to store waste pending retrieval and closure. Construction of the SST system occurred prior to *Resource Conservation and Recovery Act of 1976* (RCRA), and the current configuration and condition of the system does not meet interim status regulatory requirements for treatment, storage and disposal (TSD) facilities.

The Washington State Department of Ecology (Ecology) inspected the U.S. Department of Energy (DOE) Hanford Site SST system in fiscal years 2000 and 2001. The inspection assessed compliance with applicable regulations for management of interim status TSD facilities. The inspection identified potential violations. Subsequent negotiations between Ecology and DOE resulted in the creation of Milestone M-23-23, "Submit Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document for Ecology Approval," of the *Hanford Federal Facility Agreement and Consent Order* (HFFACO) (Ecology et al. 1989) to address the potential violations.

The Ecology inspection conducted during fiscal years 2000 and 2001 identified four potential violations (Moore 2001):

- The DOE did not complete an assessment of the Hanford Site SSTs to determine they did not leak, or determine them unfit for use, by January 12, 1990, per *Washington Administrative Code* (WAC) 173-303-400(3) and 40 *Code of Federal Regulations* (CFR) 265.191(a).
- The DOE did not install secondary containment for the SST system prior to January 12, 1991, per WAC 173-303-400(3) and 40 CFR 265.193(a).
- The DOE did not inspect all SST monitoring equipment and leak detection equipment at least once each operating day per WAC 173-303-400(3) and 40 CFR 265.195(a).
- The DOE did not remove all waste from the SST system per 40 CFR 265.196(b) and did not close the SST system per 40 CFR 265.196(e).

This document responds to HFFACO Milestone M-23-23 that requires the DOE to submit a leak detection and monitoring (LDM) functions and requirements (F&Rs) document for Ecology approval by June 15, 2002.

Section 1.1 describes the purpose and scope of this document. Section 1.2 provides a brief description of the SST system. Section 1.3 describes HFFACO Milestone M-23-23.

1.1 PURPOSE AND SCOPE

This Functions and Requirements (F&R) document establishes leak detection and monitoring functions and requirements for the single-shell tank (SST) system during pre-retrieval and post retrieval storage of waste as required by Hanford Federal Facility Agreement and Consent Order Milestone M-23-23, "Submit Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document for Ecology Approval." The F&Rs come from an

analysis of applicable regulations, the current physical condition of system components, and the current leak detection and monitoring (LDM) program. In addition, best management practices that go beyond the LDM F&Rs define how tanks will be monitored for leak detection and liquid intrusion purposes by processes other than direct in-tank liquid level detection. Table 1-1 provides a listing of the SST tanks, MUSTs, and miscellaneous cells subject to this Functions and Requirements document. Table 1-1 also provides the tank classification, interim stabilization status, LDM or BMP as applicable, the monitoring frequency, and a cross-walk to the applicable Functions and Requirements section.

Table 1-1. Single-Shell Tank System Leak Detection and Monitoring Requirements

Tank #	Type	Interim Stabilized?	LDM or BMP	Monitoring Frequency	Notes	F&R Section
241-A-103	SST	No	LDM	Quarter	N/A	4.1.1.A.3
241-BX-103	SST	No	LDM	Quarter	N/A	4.1.1.A.3
241-BY-103	SST	No	LDM	Quarter	N/A	4.1.1.A.3
241-C-102	SST	No	LDM	Quarter	N/A	4.1.1.A.3
241-T-102	SST	No	LDM	Quarter	N/A	4.1.1.A.3
241-T-112	SST	No	LDM	Quarter	N/A	4.1.1.A.3
241-A-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-A-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-A-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-A-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-A-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-AX-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-AX-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-AX-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.1

241-B-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-203	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-204	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BY-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BX-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-201	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BX-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BX-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BX-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BX-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-C-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-C-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-C-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-C-201	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-C-202	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-C-203	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-C-204	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-S-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BY-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.1

241-S-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-113	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-114	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-115	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-T-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-T-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-T-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-T-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-T-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-T-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-T-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TX-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-SX-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TX-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BY-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TX-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TX-113	SST	Yes	BMP	Annual	N/A	4.1.1.A.1

241-TX-115	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TX-116	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TX-117	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TY-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TY-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TY-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TY-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-TY-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-U-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-U-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-U-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-U-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-BY-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.1
241-B-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-B-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-B-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-B-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-B-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-B-202	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BX-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BX-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BX-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.2

241-BX-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BX-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BX-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-SX-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-201	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-SX-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BY-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BY-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BY-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BY-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-AX-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.2

241-BY-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-SX-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-SX-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-105	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-202	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-203	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-204	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-104	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-108	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BY-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.2

241-S-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-109	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-107	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-110	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TX-118	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-TY-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-201	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-202	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-203	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-204	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-A-101	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BX-103	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-C-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-106	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-T-112	SST	Yes	BMP	Annual	N/A	4.1.1.A.2

241-TX-114	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-BY-102	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-S-111	SST	Yes	BMP	Annual	N/A	4.1.1.A.2
241-U-301B	Catch Tank	Note 1	LDM	Quarter	N/A	4.1.1.B.2
241-EW-151	Catch Tank	Note 1	LDM	Quarter	N/A	4.1.1.B.2
241-A-302-A	Catch Tank	Note 1	LDM	Quarter	N/A	4.1.1.B.2
244-A	DCRT	Note 1	LDM	Quarter	N/A	4.1.1.B.2
244-S	DCRT	Note 1	LDM	Quarter	N/A	4.1.1.B.2
244-BX	DCRT	Note 1	LDM	Quarter	N/A	4.1.1.B.2
244-TX	DCRT	Note 1	LDM	Quarter	N/A	4.1.1.B.2
244-U	DCRT	No	BMP	None	Note 6	4.1.1.B.1
241-A-350	Catch Tank	Note 1	LDM	Quarter	N/A	4.1.1.B.2
244-CR Cell 1	Vault	No	BMP	None	Note 5	4.1.1.C.1
244-CR Cell 2	Vault	No	LDM	None	Note 2	4.1.1.C.2
244-CR Cell 3	Vault	No	LDM	None	Note 2	4.1.1.C.2
244-CR Cell 11	Vault	No	LDM	None	Note 2	4.1.1.C.2
244-CR-001	Tank	No	LDM	None	Note 2	4.1.1.C.2
244-CR-002	Tank	No	LDM	None	Note 2	4.1.1.C.2
244-CR-003	Tank	No	LDM	Quarter	Note 2	4.1.1.C.2

244-CR-011	Tank	No	LDM	None	Note 2	4.1.1.C.2
241-TX-302C	Catch Tank	Yes	BMP	Quarter	N/A	4.1.1.B.1
241-AX-152	Catch Tank	Yes	BMP	Quarter	N/A	4.1.1.B.1
241-A-417	Catch Tank	Yes	BMP	Annual –Note 3	N/A	4.1.1.B.1
241-ER-311	Catch Tank	Yes	BMP	Quarter	N/A	4.1.1.B.1
241-UX-302A	Catch Tank	Yes	BMP	Quarter	N/A	4.1.1.B.1
241-AX-151-CT	Catch Tank	No	BMP	None	Note 8	4.1.1.B.1
241-S-304	Catch Tank	Yes	BMP	Quarter	N/A	4.1.1.B.1
244-AR Cell 1	Vault	Yes	BMP	Quarter	Note 4	4.1.1.C.1
244-AR-Cell 2	Vault	Yes	BMP	Quarter	Note 4	4.1.1.C.1
244-AR-Cell 3	Vault	Yes	BMP	Quarter	Note 4	4.1.1.C.1
244-AR-TK-001	Tank	Yes	BMP	Quarter	Note 4	4.1.1.C.1
244-AR-TK-002	Tank	Yes	BMP	Quarter	Note 4	4.1.1.C.1
244-AR-TK-003	Tank	Yes	BMP	Quarter	Note 4	4.1.1.C.1
244-AR-TK-004		Yes	BMP	Quarter	Note 4	4.1.1.C.1
241-BY-ITS-1	Misc	Yes	BMP	None	N/A	4.1.1.C.1

241-BY-ITS2 Tank 1	Tank	No	BMP	None	Note 7	4.1.1.C.3
241-AX Ion Exchange	Misc	Tank	BMP	None	N/A	4.1.1.C.1

Note 1: Meets Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestone M 48-07 stabilization and isolation criteria. Liquid volume is above the RPP-9937 interim stabilization criteria of 400 gallons.

Note 2: 244-CR Vault Cells 1, 2, 3, and 11 and tanks CR-001, 002, 011 levels were assessed under HFFACO Milestone M-23-26 as there was no level instrumentation installed. Level instruments still must be installed. Quarterly frequency for tank CR-003 is consistent with 4.1.1.C.2.

Note 3: Annual monitoring of 241-A-417 was established by letter DOE Office of River Protection 03-TOD-073 to Ecology.

Note 4: 244-AR vault interim stabilized under HFFACO Milestone M-45-11. All liquid removed from tanks and cells.

Note 5: 244-CR Vault Cells 1 level was assessed under HFFACO Milestone M-23-26 as there was no level instrumentation installed. The cell was found to contain no liquid.

Note 6: 244-U was never placed in service and did not receive dangerous waste.

Note 7: 241-BY-ITS2 Tank 1 is not monitored due to lack of instrumentation. Liquid level was assessed under HFFACO Milestone M-23-26.

Note 8: 241-AX-151-CT is not monitored. Tank has been out-of-service since 1977. Tank was included in the Inactive Miscellaneous Underground Storage Tank (IMUST) program. Tank level was assessed under HFFACO Milestone M-23-26

There are several functions related to leak detection that are applied to the components of the SST system based on the requirements of 40 Code of Federal Regulations (CFR) 265. These functions have been developed in response to the regulations and include:

- Detect the leak,
- Contain the leak,
- Respond to the leak, and
- Evaluate the SST system status.

Each function must be accomplished in a manner that meets a specified objective, referred to as a requirement. Examples of requirements include:

- Detect the leak within 24 hours or as soon as practicable,
- Contain the leak,
- Respond to the leak within 24 hours of detecting the leak,
- Determine if the waste is compatible with the tank material.

This document also identifies and describes SST system components, requirements applicable to leak monitoring of SST system components, and components that currently do and do not have leak monitoring. This document groups the components in the SST system and assigns F&Rs to these groups consistent with the leak monitoring requirements of 40 CFR 265. Changes to the current monitoring program based on the difference between its current state and its required state are provided.

This document provides the basis for sorting the 149 SSTs into four groups for purposes of establishing the LDM F&R. Data used to group the tanks were derived from published data available that describe the condition of the SSTs, and the quantity and characteristics of the waste in the tanks. The groupings are based on the volume of drainable liquid capable of leaking to the environment, the integrity of the SST, the ability of existing Tank Farm technology to detect and respond to a leak if one occurred, and the potential significance of a leak. All 149 SSTs will receive monitoring, either as direct liquid level monitoring to detect leaks or as periodic monitoring to detect liquid intrusions. If conditions for a tank change as a result of monitoring or retrieval, the grouping and monitoring frequency will be reevaluated and re-categorized per the requirements established by this document.

This document provides the basis for sorting MUSTs for purposes of establishing the LDM F&Rs. The groupings are based on the volume of drainable liquid capable of leaking to the environment, the potential for liquid intrusions, and the available information on the liquid volumes. The MUSTs subject to the requirements in this document include the MUSTs associated with the Single-Shell Tank (SST) system that are not Resource Conservation and Recovery Act of 1976 (RCRA) Past-Practice or Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Past-Practice Units. The MUSTs identified

in this document will receive monitoring, either direct liquid level monitoring to detect leaks or as periodic monitoring to detect liquid intrusions. If conditions for a MUST change, the grouping and monitoring frequency will be reevaluated and recategorized per the requirements established by this document.

This document provides the basis for sorting vessels and cells in miscellaneous structures into three groups for purposes of establishing the LDM F&Rs. The groupings are based on the volume of drainable liquid capable of leaking to the environment, the potential for liquid intrusions, and the available information on the liquid volumes. Vessels and cells subject to the requirements in this document include those associated with the SST system that are not RCRA Past-Practice or CERCLA Past-Practice Units. Vessel and cell conditions will receive routine monitoring. If conditions for a vessel change, the grouping and monitoring frequency will be reevaluated and per the requirements established by this document.

Functions and requirements for monitoring other activities associated with the SST system, including monitoring associated with retrieval or groundwater quality, are beyond the scope of this document. Liquid level monitoring activities based on F&Rs other than detecting and responding to a leak are, however, discussed in Section 5.0 and Appendix B with best management practices identified for appropriate tanks and vessels. This document is a Hanford Federal Facility Agreement and Consent Order Primary Document requiring Washington State Department of Ecology review and approval. Document revisions will follow the criteria outlined in Section 9.3 of the Hanford Federal Facility Agreement and Consent Order.

This document fulfills the requirements of HFFACO Milestone M-23-23 by describing LDM F&Rs for the SST system. These F&Rs satisfy the following purposes.

Functions – Identify tasks, activities, and actions required to transform current conditions to the desired end state.

Requirements -- Define parameters that, when met, provide assurance the end-state product will meet the mission need.

As required by HFFACO Milestone M-23-23, this document includes:

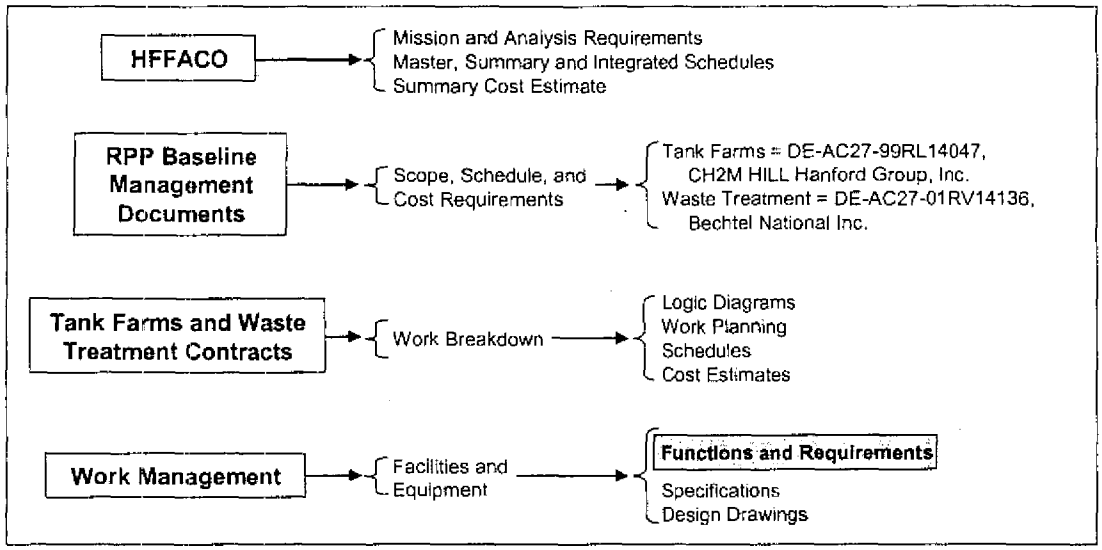
- Identification of applicable interim status regulations for leak detection, monitoring, and surveillance of the SST system (Section 2.0);
- Description of the SST system and ancillary components (Section 3.0);
- Identification and detail of SST system monitoring instruments (Section 5.0);
- Identification of SST system components not monitored by instrumentation (Section 3.0 and Appendix A);
- Procedures for evaluating the status of individual tanks and ancillary equipment components (Section 5.0);

- Single-shell tank LDM frequencies and other parameters associated with the inspection and LDM of the tank system based on applicable regulatory requirements for leak detection (Section 4.0 and Appendix B);
- Associated budget and schedule estimates for needed upgrades (Appendix C and Appendix D); and
- An HFFACO change control process governing Agreement Primary Documents (Section 6.0).

Upon approval by the DOE Office of River Protection (ORP) and Ecology, this document becomes an Agreement Primary Document pursuant to Action Plan Section 9.2.1 of the HFFACO. Approval of this document provides the basis for updating the LDM program for the SST system.

Figure 1-1 shows the hierarchy of the DOE ORP River Protection Project (RPP) management system documents. This F&Rs document supports SST system work management including system specification and design drawings and facility operations maintenance and management.

Figure 1-1. River Protection Project Management System Document Hierarchy



HFFACO = *Hanford Federal Facility Agreement and Consent Order*
RPP = River Protection Project

1.2 INTEGRATION AND COORDINATION

In 2001, DOE and Ecology concluded negotiations of milestones that required the DOE to submit documents addressing the F&Rs for SST system LDM and SST system integrity (HFFACO Milestones M-23-23 and M-23-24, "Submit Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document," and "Submit Single-Shell Tank System Integrity Assessment Report and Associated Certification(s) and Determination(s) Pursuant to 40 CFR 265.191," respectively).

This document only addresses LDM F&Rs for SST system components associated with storage of waste governed by RCRA. This document addresses F&Rs for LDM; it does not address F&Rs for other activities associated with the SST system, including monitoring associated with retrieval or groundwater quality.

1.3 OVERVIEW OF THE SINGLE-SHELL TANK SYSTEM

The Hanford SST system consists of 149 SSTs, and ancillary tanks, pits, pipes and structures located in 12 tank farms in the 200 East and 200 West Areas (Figure 1-2). The SST system contains radioactive and chemical waste generated by nuclear defense activities that began at the site in 1944. The SST system no longer receives process waste, and is regulated as interim status TSD facilities pending closure.

The SST system consists of underground, reinforced concrete, steel-lined SSTs with capacities from 55,000 to 1,000,000 gallons with flat or dish-shaped bottoms and domed tops (Figure 1-3); miscellaneous underground storage tanks (MUSTs) with operating volumes of less than 50,000 gallons; pits; piping; and vessels and cells in miscellaneous structures.

Section 3.0 of this document discusses SST system and leak detection components in more detail.

Figure 1-2. Location of Single-Shell Tanks and Double-Shell Tanks at the Hanford Site

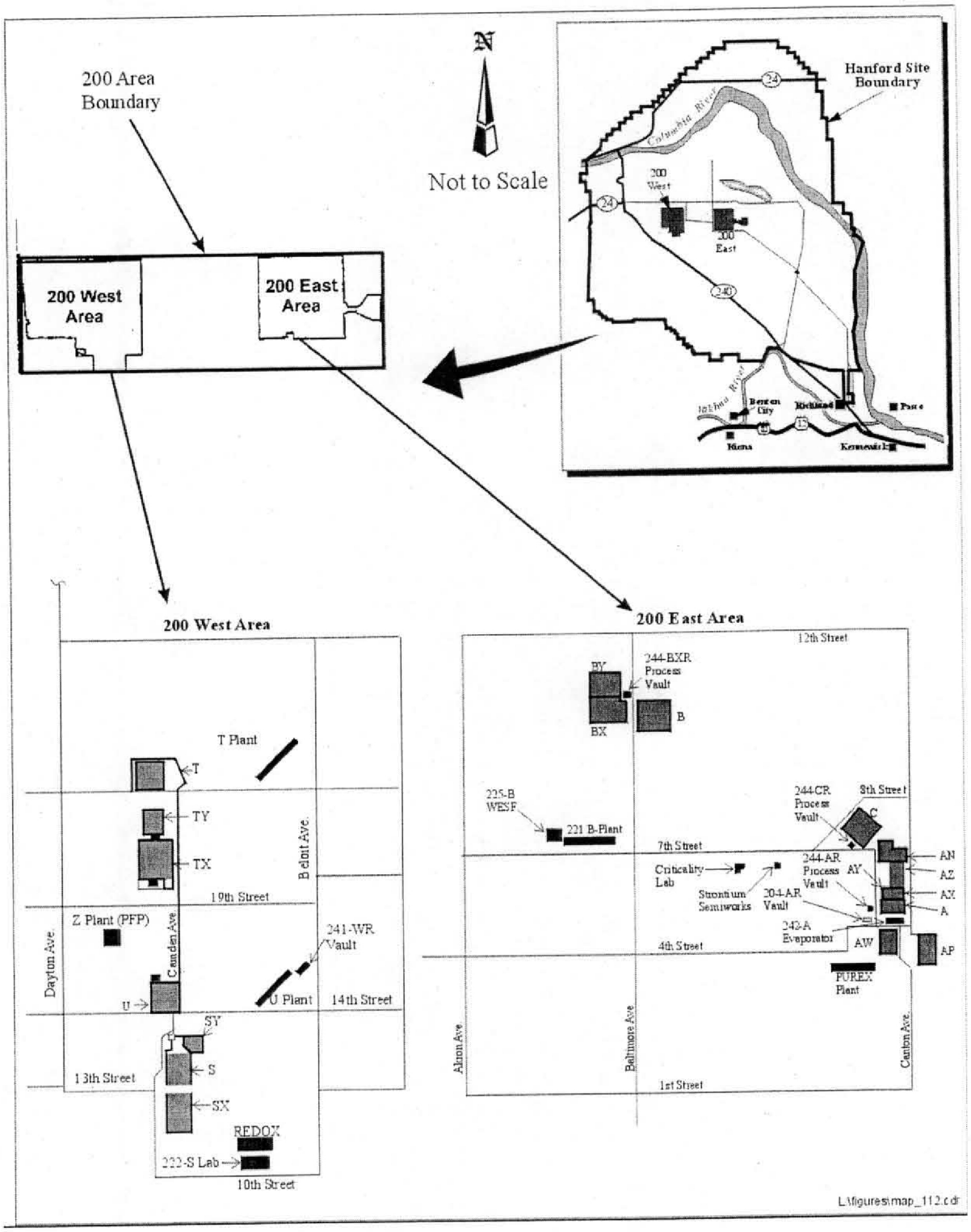
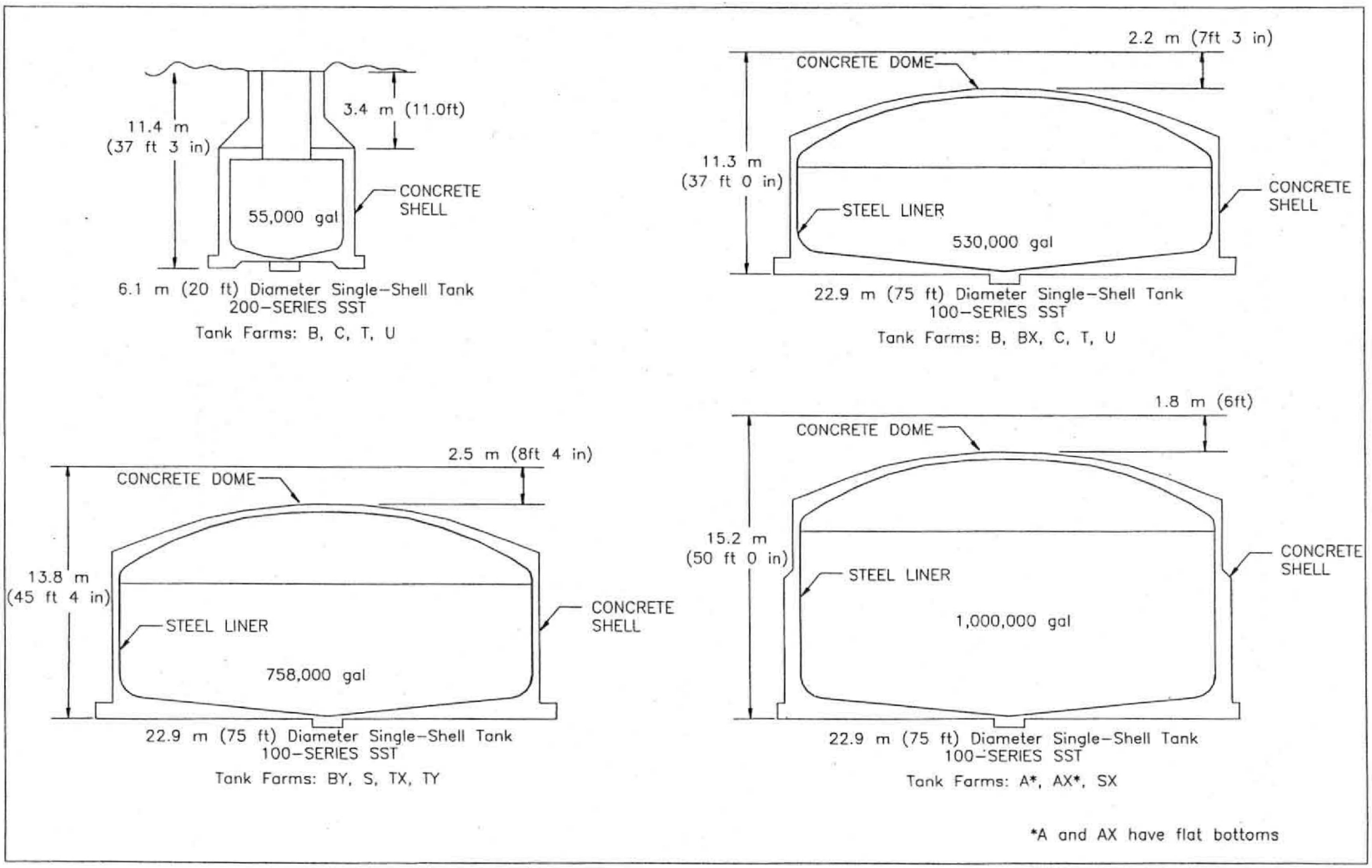


Figure 1-3. Cross-Sectional Views of Hanford Site Single-Shell Tanks



This page intentionally left blank

2.0 SINGLE-SHELL TANK SYSTEM REGULATIONS

The LDM F&Rs established by this document derive from 40 CFR 265, "Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities" (incorporated by reference in WAC 173-303) and from HFFACO Milestone M-23-24. Sections 2.1 and 2.2 cite applicable details from these regulations.

2.1 STATE AND FEDERAL REGULATIONS

For interim status facility standards, the Washington State dangerous waste regulations are defined in WAC 173-303-400. The dangerous waste regulations incorporate by reference the standards set forth by the U.S. Environmental Protection Agency in 40 CFR 265 Subpart J for tank systems and define additional requirements and exceptions to 40 CFR Part 265 in WAC 173-303-400(3), "Dangerous Waste Regulations, Interim Status Facility Standards." Excerpts from the State dangerous waste regulations for interim status tank systems are described in Table 2-1.

Table 2-1. Washington State Regulations (2 Sheets)

WAC	Regulation
WAC 173-303-400	"(1) Purpose. The purpose of WAC 173-303-400 is to establish standards which define the acceptable management of dangerous waste during the period of interim status and until certification of final closure or, if the facility is subject to post-closure requirements, until post-closure responsibilities are fulfilled. (2) Applicability (a) Except as provided in 40 CFR 265.1080(b), the interim status standards apply to owners and operators of facilities that treat, store, transfer, and/or dispose of dangerous waste. For purposes of this section, interim status applies to all facilities that comply fully with the requirements of interim status under Section 3005(c) of the Federal Resource Conservation and Recovery Act or WAC 173-303-805… (3) Standards (a) Interim status standards are the standards set forth by the Environmental Protection Agency in 40 CFR Part 265 Section 265.19 of Subpart B, Subparts F through R, Subpart W, Subparts AA, BB, CC (including references to 40 CFR Parts 60, 61, and 63), DD, EE, and Appendix VI, which are incorporated by reference into this regulation (including, by reference, any EPA requirements specified in those subparts which are not otherwise explicitly described in this chapter), and: (i) The land disposal restrictions of WAC 173-303-140; the facility requirements of WAC 173-303-280 through 173-303-440 except WAC 173-303-335; and the corrective action requirements of WAC 173-303-646; (ii) WAC 173-303-630(3), for containers… (iii) WAC 173-303-640 (5)(d), for tanks; and (iv) WAC 173-303-805.

Table 2-1. Washington State Regulations (2 Sheets)

WAC	Regulation
WAC 173-303-400	(b) For purposes of applying the interim status standards of 40 CFR Part 265 Subparts F through R…to the state of Washington facilities, the federal terms have (and in the case of the wording used in the financial instruments referenced in Subpart H of Part 265, must be replaced with) the following state of Washington meanings: (i) "Regional administrator" means the "department" except for 40 CFR Parts 270.2; 270.3… (ii) "Hazardous" means "dangerous" except for Subparts AA, BB, and DD. (iii) "Compliance procedure" has the meaning set forth in WAC 173-303-040, Definitions. (iv) "EPA hazardous waste numbers" mean "dangerous waste numbers" (c) In addition to the changes described in (b) of this subsection, the following modifications are made to interim status standards of 40 CFR Part 265 Subparts F through R… (i) The words "the effective date of these regulations" means"(A) November 19, 1980, for facilities which manage any wastes designated by 40 CFR Part 261; (B) For wastes which become designated by 40 CFR Part 261 subsequent to November 19, 1980, the effective date is the date on which the wastes become regulated; (C) March 12, 1982, for facilities which manage any wastes designated by 40 CFR Part 261… (vii) "Subpart J – tank systems" section 265.193(a) is modified so that the dates by which secondary containment (which meets the requirements of that section) must be provided are the same as the dates in WAC 173-303-640 (4)(a). (viii) "Subpart J – tank systems" section 265.191(a) is modified so that the date by which an assessment of a tank system's integrity musts be completed is January 12, 1990…"

The following pages cite applicable regulations from 40 CFR 265 in three categories:

- Containment and detection of releases (Table 2-2),
- Inspections (Table 2-3),
- Responses to leaks or spills and disposition of leaking or unfit-for-use tank systems (Table 2-4).

Note that Section 2.1 does not include citations from 40 CFR 265.191, "Assessment of Existing Tank Systems' Integrity." Milestone M-23-24 of the HFFACO contains the implementing language agreed upon by Ecology and the ORP for the SST system integrity assessment required by 40 CFR 265.191. Section 2.2 describes regulatory requirements from HFFACO Milestones M-23-23 and M-23-24.

Table 2-2. Containment and Detection of Releases (7 Sheets)

CFR	Regulation
40 CFR 265.193	"(a) In order to prevent the release of hazardous waste or hazardous constituents to the environment, secondary containment that meets the requirements of this section must be provided (except as provided in paragraphs (f) and (g) of this section): (1) For all new tank systems or components, prior to their being put into service; (2) For all existing tanks used to store or treat EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027, within two years after January 12, 1987; (3) For those existing tank systems of known and documentable age, within two years after January 12, 1987, or when the tank systems have reached 15 years of age, whichever comes later; (4) For those existing tank system for which the age cannot be documented, within eight years of January 12, 1987; but if the age of the facility is greater than seven years, secondary containment must be provided by the time the facility reaches 15 years of age, or within two years of January 12, 1987, whichever comes later; and (5) For tank systems that store or treat materials that become hazardous wastes subsequent to January 12, 1987, within the time intervals required in paragraphs (a)(1) through (a)(4) of this section, except that the date that a material becomes a hazardous waste must be used in place of January 12, 1987. (b) Secondary containment systems must be: (1) Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time during the use of the tank system; and (2) Capable of detecting and collecting releases and accumulated liquids until the collected material is removed. (c) To meet the requirements of paragraph (b) of this section, secondary containment systems must be at a minimum: (1) Constructed of or lined with materials that are compatible with the waste(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrological forces), physical contact with the waste to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation (including stresses from nearby vehicular traffic); (2) Placed on a foundation or base capable of providing support to the secondary containment system and resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression, or uplift; (3) Provided with a leak detection system that is designed and operated so that it will detect the failure of either the primary and secondary containment structure or any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time if the existing detection technology or site conditions will not allow detection of a release within 24 hours;

Table 2-2. Containment and Detection of Releases (7 Sheets)

CFR	Regulation
40 CFR 265.193	(4) Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health or the environment, if removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours. Note: If the collected material is a hazardous waste under part 261of this chapter, it is subject to management as a hazardous waste in accordance with all applicable requirements of parts 262 through 265 of this chapter. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to Publicly Owned Treatment Works (POTWs), it is subject to the requirements of section 307 of the Clear Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR Part 302. (d) Secondary containment for tanks must include one or more of the following devices: (1) A liner (external to the tank); (2) A vault; (3) A double-walled tank; or (4) An equivalent device as approved by the Regional Administrator. (e) In addition to the requirements of paragraphs (b), (c), and (d) of this section, secondary containment systems must satisfy the following requirements: (1) External liner systems must be: (i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary; (ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event; (iii) Free of cracks or gaps; and (iv) Designed and installed to completely surround the tank and to cover all surrounding earth likely to come into contact with the waste if released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste). (2) Vault systems must be: (i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary; (ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;

Table 2-2. Containment and Detection of Releases (7 Sheets)

CFR	Regulation
40 CFR 265.193	(iii) Constructed with chemical-resistant water stops in place at all joints (if any); (iv) Provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete; (v) Provided with a means to protect against the formation of and ignition of vapors within the vault, if the waste being stored or treated: (A) Meets the definition of ignitable waste under Sec. 262.21 of this chapter, or (B) Meets the definition of reactive waste under Sec. 262.21 of this chapter and may form an ignitable or explosive vapor; and (vi) Provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the vault if the vault is subject to hydraulic pressure. (3) Double-walled tanks must be: (i) Designed as an integral structure (i.e., an inner tank within an outer shell) so that any release from the inner tank is contained by the outer shell; (ii) Protected, if constructed of metal, from both corrosion of the primary tank interior and the external surface of the outer shell; and (iii) Provided with a built-in, continuous leak detection system capable of detecting a release within 24 hours or at the earliest practicable time, if the owner or operator can demonstrate to the Regional Administrator, and the Regional Administrator concurs, that the existing leak detection technology or site conditions will not allow detection of a release within 24 hours. Note: The provisions outlined in the Steel Tank Institute's (STI) 'Standard for Dual Wall Underground Steel Storage Tank" may be used as guidelines for aspects of the design of underground steel double-walled tanks. (f) Ancillary equipment must be provided with full secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of paragraphs (b) and (c) of this section except for: (1) Aboveground piping (exclusive of flanges, joints, valves, and connections) that are visually inspected for leaks on a daily basis; (2) Welded flanges, welded joints, and welded connections that are visually inspected for leaks on a daily basis; (3) Sealless or magnetic coupling pumps and sealless valves, that are visually inspected for leaks on a daily basis; and (4) Pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis.

Table 2-2. Containment and Detection of Releases (7 Sheets)

CFR	Regulation
40 CFR 265 193	(g) The owner or operator may obtain a variance from the requirements of this Section if the Regional Administrator finds, as a result of a demonstration by the owner or operator, either: that alternative design and operating practices, together with location characteristics, will prevent the migration of hazardous waste or hazardous constituents into the ground water or surface water at least as effectively as secondary containment during the active life of the tank system or that in the event of a release that does migrate to ground water or surface water, no substantial present or potential hazard will be posed to human health or the environment. New underground tank systems may not, per a demonstration in accordance with paragraph (g)(2) of this section, be exempted from the secondary containment requirements of this section. Application for a variance as allowed in paragraph (g) of this section does not waive compliance with the requirements of this subpart for new tank systems. (1) In deciding whether to grant a variance based on a demonstration of equivalent protection of ground water and surface water, the Regional Administrator will consider: (i) The nature and quantity of the waste; (ii) The proposed alternate design and operation; (iii) The hydrogeologic setting of the facility, including the thickness of soils between the tank system and ground water; and (iv) All other factors that would influence the quality and mobility of the hazardous constituents and the potential for them to migrate to ground water or surface water. (2) In deciding whether to grant a variance, based on a demonstration of no substantial present or potential hazard, the Regional Administrator will consider: (i) The potential adverse effects on ground water, surface water, and land quality taking into account: (A) The physical and chemical characteristics of the waste in the tank system, including its potential for migration, (B) The hydrogeological characteristics of the facility and surrounding land, (C) The potential for health risks caused by human exposure to waste constituents, (D) The potential for damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents, and (E) The persistence and permanence of the potential adverse effects; (ii) The potential adverse effects of a release on ground-water quality, taking into account: (A) The quantity and quality of ground water and the direction of ground-water flow, (B) The proximity and withdrawal rates of water in the area, (C) The current and future uses of ground water in the area, and

Table 2-2. Containment and Detection of Releases (7 Sheets)

CFR	Regulation
40 CFR 265.193	(D) The existing quality of ground water, including other sources of contamination and their cumulative impact on the ground-water quality; (iii) The potential adverse effects of a release on surface water quality, taking into account: (A) The quantity and quality of ground water and the direction of ground-water flow, (B) The patterns of rainfall in the region, (C) The proximity of the tank system to surface waters, (D) The current and future uses of surface waters in the area and any water quality standards established for those surface waters, and (E) The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality; and (iv) The potential adverse effects of a release on the land surrounding the tank system, taking into account: (A) The patterns of rainfall in the region, and (B) The current and future uses of the surrounding land. (3) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system but has not migrated beyond the zone of engineering control (as established in the variance), must: (i) Comply with the requirements of Sec. 265.196, except paragraph (d); and (ii) Decontaminate or remove contaminated soil to the extent necessary to: (A) Enable the tank system, for which the variance was granted, to resume operation with the capability for the detection of and response to releases at least equivalent to the capability it had prior to the release, and (B) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water; and (iii) If contaminated soil cannot be removed or decontaminated in accordance with paragraph (g)(3)(ii) of this section, comply with the requirements of Sec. 265.197(b); (4) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system and has migrated beyond the zone of engineering control (as established in the variance), must: (i) Comply with the requirements of Sec. 265.196(a), (b), (c), and (d); and

Table 2-2. Containment and Detection of Releases (7 Sheets)

CFR	Regulation
40 CFR 265.193	(ii) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water, if possible, and decontaminate or remove contaminated soil. If contaminated soil cannot be decontaminated or removed, or if ground water has been contaminated, the owner or operator must comply with the requirements of Sec. 265.197(b); (iii) If repairing, replacing, or reinstalling the tank system, provide secondary containment in accordance with the requirements of paragraphs (a) through (f) of this section or reapply for a variance from secondary containment and meet the requirements for new tank systems in Sec. 265.192 if the tank system is replaced. The owner or operator must comply with these requirements even if contaminated soil can be decontaminated or removed, and ground water or surface water has not been contaminated. (h) The following procedures must be followed in order to request a variance from secondary containment: (1) The Regional Administrator must be notified in writing by the owner or operator that he intends to conduct and submit a demonstration for a variance from secondary containment as allowed in paragraph (g) of this section according to the following schedule: (i) For existing tank systems, at least 24 months prior to the date that secondary containment must be provided in accordance with paragraph (a) of this section; and (ii) For new tank systems, at least 30 days prior to entering into a contract for installation of the tank system. (2) As part of the notification, the owner or operator must also submit to the Regional Administrator a description of the steps necessary to conduct the demonstration and a timetable for completing each of the steps. The demonstration must address each of the factors listed in paragraph (g)(1) or paragraph (g)(2) of this section. (3) The demonstration for a variance must be completed and submitted to the Regional Administrator within 180 days after notifying the Regional Administrator of intent to conduct the demonstration. (4) The Regional Administrator will inform the public, through a newspaper notice, of the availability of the demonstration for a variance. The notice shall be placed in a daily or weekly major local newspaper of general circulation and shall provide at least 30 days from the date of the notice for the public to review and comment on the demonstration for a variance. The Regional Administrator also will hold a public hearing, in response to a request or at his own discretion, whenever such a hearing might clarify one or more issues concerning the demonstration for a variance. Public notice of the hearing will be given at least 30 days prior to the date of the hearing and may be given at the same time as notice of the opportunity for the public to review and comment on the demonstration. These two notices may be combined.

Table 2-2. Containment and Detection of Releases (7 Sheets)

CFR	Regulation
40 CFR 265.193	(5) The Regional Administrator will approve or disapprove the request for a variance within 90 days of receipt of the demonstration from the owner or operator and will notify in writing the owner or operator and each person who submitted written comments or requested notice of the variance decision. If the demonstration for a variance is incomplete or does not include sufficient information, the 90-day time period will begin when the Regional Administrator receives a complete demonstration, including all information necessary to make a final determination. If the public comment period in paragraph (h)(4) of this section is extended, the 90-day time period will be similarly extended. (i) All tank systems, until such time as secondary containment meeting the requirements of this section is provided, must comply with the following: (1) For non-enterable underground tanks, a leak test that meets the requirements of Sec. 265.191(b)(5) must be conducted at least annually; (2) For other than non-enterable underground tanks and for all ancillary equipment, an annual leak test, as described in paragraph (i)(1) of this section, or an internal inspection or other tank integrity examination by an independent, qualified, registered professional engineer that addresses cracks, leaks, corrosion, and erosion must be conducted at least annually. The owner or operator must remove the stored waste from the tank, if necessary, to allow the condition of all internal tank surfaces to be assessed. Note: The practices described in the American Petroleum Institute (API) Publication Guide for Inspection of Refining Equipment, Chapter XIII, 'Atmospheric and Low Pressure Storage Tanks,' 4th edition, 1981, may be used, when applicable, as guidelines for assessing the overall condition of the tank system. (3) The owner or operator must maintain on file at the facility a record of the results of the assessments conducted in accordance with paragraphs (i)(1) through (i)(3) of this section. (4) If a tank system or component is found to be leaking or unfit-for-use as a result of the leak test or assessment in paragraphs (i)(1) through (i)(3) of this section, the owner or operator must comply with the requirements of Sec. 265.196."

Table 2-3. Inspections

CFR	Regulation
40 CFR 265.195	"(a) The owner or operator must inspect, where present, at least once each operating day: (1) Overfill/spill control equipment (e.g., waste-feed cutoff systems, bypass systems, and drainage systems) to ensure that it is in good working order; (2) The aboveground portions of the tank system, if any, to detect corrosion or releases of waste; (3) Data gathered from monitoring equipment and leak-detection equipment, (e.g., pressure and temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design; and (4) The construction materials and the area immediately surrounding the externally accessible portion of the tank system including secondary containment structures (e.g., dikes) to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation); Note: Section 265.15(c) requires the owner or operator to remedy any deterioration or malfunction he finds. Section 265.196 requires the owner or operator to notify the Regional Administrator within 24 hours of confirming a release. Also, 40 CFR part 302 may require the owner or operator to notify the National Response Center of a release. (b) The owner or operator must inspect cathodic protection systems, if present, according to, at a minimum, the following schedule to ensure that they are functioning properly: (1) The proper operation of the cathodic protection system must be confirmed within six months after initial installation, and annually thereafter; and (2) All sources of impressed current must be inspected and/or tested, as appropriate, at least bimonthly (i.e., every other month). Note: The practices described in the National Association of Corrosion Engineers (NACE) standard, 'Recommended Practice (RP-02-85)--Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems,' and the American Petroleum Institute (API) Publication 1632, 'Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems,' may be used, where applicable, as guidelines in maintaining and inspecting cathodic protection systems. (c) The owner or operator must document in the operating record of the facility an inspection of those items in paragraphs (a) and (b) of this section."

Table 2-4. Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems (2 Sheets)

CFR	Regulation
40 CFR 265.196	"A tank system or secondary containment system from which there has been a leak or spill, or which is unfit for use, must be removed from service immediately, and the owner or operator must satisfy the following requirements: (a) Cessation of use; prevent flow or addition of wastes. The owner or operator must immediately stop the flow of hazardous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release. (b) Removal of waste from tank system or secondary containment system. (1) If the release was from the tank system, the owner or operator must, within 24 hours after detection of the leak or, if the owner or operator demonstrates that that is not possible, at the earliest practicable time remove as much of the waste as is necessary to prevent further release of hazardous waste to the environment and to allow inspection and repair of the tank system to be performed. (2) If the release was to a secondary containment system, all released materials must be removed within 24 hours or in as timely a manner as is possible to prevent harm to human health and the environment. (c) Containment of visible releases to the environment. The owner or operator must immediately conduct a visual inspection of the release and, based upon that inspection: (1) Prevent further migration of the leak or spill to soils or surface water; and (2) Remove, and properly dispose of, any visible contamination of the soil or surface water. (d) Notifications, reports. (1) Any release to the environment, except as provided in paragraph (d)(2) of this section, must be reported to the Regional Administrator within 24 hours of detection. If the release has been reported pursuant to 40 CFR part 302, that report will satisfy this requirement. (2) A leak or spill of hazardous waste that is: (i) Less than or equal to a quantity of one (1) pound, and (ii) Immediately contained and cleaned-up is exempted from the requirements of this paragraph. (3) Within 30 days of detection of a release to the environment, a report containing the following information must be submitted to the Regional Administrator: (i) Likely route of migration of the release; (ii) Characteristics of the surrounding soil (soil composition, geology, hydrogeology, climate); (iii) Results of any monitoring or sampling conducted in connection with the release, (if available). If sampling or monitoring data relating to the release are not available within 30 days, these data must be submitted to the Regional Administrator as soon as they become available; (iv) Proximity to downgradient drinking water, surface water, and population areas; and

Table 2-4. Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems (2 Sheets)

CFR	Regulation
40 CFR 265.196	(v) Description of response actions taken or planned. (e) Provision of secondary containment, repair, or closure. (1) Unless the owner or operator satisfies the requirements of paragraphs (e) (2) through (4) of this section, the tank system must be closed in accordance with Sec. 265.197. (2) If the cause of the release was a spill that has not damaged the integrity of the system, the owner/operator may return the system to service as soon as the released waste is removed and repairs, if necessary, are made. (3) If the cause of the release was a leak from the primary tank system into the secondary containment system, the system must be repaired prior to returning the tank system to service. (4) If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the owner/operator must provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of Sec. 265.193 before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system. If the source is an aboveground component that can be inspected visually, the component must be repaired and may be returned to service without secondary containment as long as the requirements of paragraph (f) of this section are satisfied. If a component is replaced to comply with the requirements of this subparagraph, that component must satisfy the requirements for new tank systems or components in Secs. 265.192 and 265.193. Additionally, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an inground or onground tank), the entire component must be provided with secondary containment in accordance with Sec. 265.193 prior to being returned to use. (f) Certification of major repairs. If the owner or operator has repaired a tank system in accordance with paragraph (e) of this section, and the repair has been extensive (e.g., installation of an internal liner; repair of a ruptured primary containment or secondary containment vessel), the tank system must not be returned to service unless the owner/operator has obtained a certification by an independent, qualified, registered professional engineer in accordance with Sec. 270.11(d) that the repaired system is capable of handling hazardous wastes without release for the intended life of the system. This certification must be submitted to the Regional Administrator within seven days after returning the tank system to use. Note: The Regional Administrator may, on the basis of any information received that there is or has been a release of hazardous waste or hazardous constituents into the environment, issue an order under RCRA section 3004(v), 3008(h), or 7003(a) requiring corrective action or such other response as deemed necessary to protect human health or the environment. Note: See Sec. 265.15(c) for the requirements necessary to remedy a failure. Also, 40 CFR Part 302 requires the owner or operator to notify the National Response Center of a release of any 'reportable quantity.'"

2.2 REQUIREMENTS FROM THE *HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER*

This section cites applicable requirements from HFFACO Milestones M-23-23 and M-23-24. Milestone M-23-23 requires creation of the LDM F&Rs document; Table 2-5 cites these requirements. Milestone M-23-24 contains the implementing language agreed upon by the DOE ORP and Ecology for 40 CFR 265.191; Table 2-6 cites these requirements.

Table 2-5. Milestone M-23-23

Milestone	Description	Due Date
M-23-23	"Submit Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document for Ecology Approval. The SST system leak detection and monitoring functions and requirements document will identify and document the location and specification of all components of DOE's existing SST leak detection and monitoring system, and will establish specifications for system upgrades and/or programmatic improvements. The functions and requirements document shall be submitted for Ecology approval as an agreement primary document pursuant to action plan section 9.2.1, and shall include the following: (1) The identification and detail of SST system monitoring instruments, (2) The identification of SST system components not monitored by instrumentation, (3) procedures for the evaluation of individual tank and ancillary equipment component status, (4) Monitoring frequencies and other parameters associated with the inspection and (leak detection) monitoring of the tank system (5) The need for detection and monitoring system upgrades so as to achieve compliance with regulatory and DOE requirements, and (6) Associated budgetary and schedule estimates. The SST leak detection and monitoring functions and requirements document shall also contain: an adequate level of detail so as to allow Ecology to assess the adequacy of the program, a proposed implementation schedule for upgrades and programmatic changes, and a corresponding draft agreement change request. Following approval work requirements of the SST system leak detection and monitoring functions and requirements document shall be implemented as enforceable primary document requirement under the agreement."	June 15, 2002

Table 2-6. Milestone M-23-24 (3 Sheets)

Milestone	Description	Due Date
M-23-24	"Submit single-shell tank system integrity assessment report and associated certification(s) and determination(s) pursuant to 40 CFR 265.191. This report shall document and assess the integrity of DOE's SST system pursuant to the requirements of 40 CFR 265.191. The SST system is comprised of DOE's one hundred-forty nine (149) SST's and their ancillary equipment. This report shall be certified by an independent, qualified, registered, professional engineer (IQRPE) attesting to the tank system's integrity (see certification at M-23-24) and shall contain a conclusory statement as to DOE's determination that the (SST) tank system either is not leaking or is unfit for use pursuant to 40 CFR 265.191. For other than non enterable portions of the SST system which DOE finds fit for use (pursuant to 40 CFR 265.191) by mean other than leak testing pursuant to 40 CFR 265.191(b)(5), such assessment/findings may be conducted in accordance with the practices described in the American Petroleum Institute (API) publication, Guide for Inspection or Refinery Equipment, Chapter XIII, Atmospheric and Low-Pressure Tanks. DOE's report shall have the objective of determining SST system integrity, and whether or not the (SST) tank system is adequately designed and has sufficient structural strength and compatability with the waste(s) to be stored or treated to ensure that it will not collapse, rupture, or fail. The SST system integrity assessment report shall document, at a minimum, all information gathered for the SST system to meet the requirements of 40 CFR, Subpart J, Part 265.191(1), (2), (3), (5)(i) and (5)(ii), including the following: A. 40 CFR 265.191(b)(1) – Design Standards: A concise and specific description: of the materials used in construction, construction methods employed, quality control, and testing performed on materials, and the final structure, prior to being placed in service, all engineering codes referenced for construction, design operating specification, and a presentation of all calculations employed to determine each structures design strength, and useful life. An evaluation of the design life of each SST system component shall be described, based on all data gathered, waste compatability with the materials of construction, history of corrosion protection, operational history (including any documented or detected leaks), schematics depicting the location of tank breaches if known, visual examinations, and any other sources of tank integrity assessment information gathered for each tank and associated SST system ancillary equipment. DOE's report shall also include a tabular listing by component equipment number, of all transfer pipelines within the SST system, describing the materials of construction, and compliance with secondary containment requirements.	June 30, 2002

Table 2-6. Milestone M-23-24 (3 Sheets)

Milestone	Description	Due Date
M-23-24	B. 40 CFR 265.191(b)(2) – Hazardous Characteristics of the Wastes That Have Been, or will be Handled: A concise and specific presentation describing the compatibility of the waste stored in each tank with the tank structure and materials. This presentation shall include the following at a minimum: waste chemical characteristics and properties such as corrosivity, temperature, homogeneity, organic content, specific gravity, gas retention and generation, flammability, and a comparison between the waste currently stored, and/or proposed to be stored in each tank to the design specification for each tank. C. 40 CFR 265.191(b)(3) – Existing Corrosion Protection Measures: A thorough description and history of all corrosion protection measures employed for all transfer systems (e.g., caustic flushes), within each SST since completion of construction. This history shall include a description of all sampling and analysis performed to monitor the status of corrosion inhibitor adjustments to chemical composition of the waste within each SST, or transferred through SST transfer system lines. D. 40 CFR 265.191(b)(4) – Documented Age of the Tank System: The age of each component of the SST system, including the SST's and their ancillary equipment, shall be described, including the completed construction date, the date placed in service, and the date of first receipt of waste. E. 40 CFR 265.191(b)(5) – Results of Leak Test(s), Internal Inspection(s) or other Tank Integrity Examinations for Each Tank and Associated Ancillary Equipment, Including the Following: The results of all examination(s) of the primary containment structure of each of the one hundred-forty nine (149) SST's and their ancillary equipment. The results of corrosion probes existing in each tank, results of testing on simulated tank structures, or materials, and studies of the effects of waste stored within each tank on the tank's materials of construction. All corrosion studies of any transfer pipelines shall also be included in this integrity assessment report. The results of leak and/or pressure testing, including associated testing regimen and specifications for all SST waste transfer systems. A summary, in tabular form or otherwise, of observations and conclusions from all visual examinations by direct observation or remote camera surveillance, within each SST. This summary shall include observations and conclusions from all visual observations by direct observation or remote camera surveillance, taken within SST system ancillary equipment (e.g., valve pits, pump pits, double-contained receiver tanks, catch tanks, vaults, transfer pipelines). All videotapes from remote camera surveillance shall be retained in the facility's operating record and shall be available to Ecology on request.	June 30, 2002

Table 2-6. Milestone M-23-24 (3 Sheets)

Milestone	Description	Due Date
M-23-24	Certification by an independent, qualified, registered, professional, engineer (IQRPE) meeting the following requirements: 1. To meet the requirements for 'independent,' the IQRPE must not be employed by any company that is either operated, or exists, as a prime contractor for the Hanford Contract Team. Further, the IQRPE cannot have worked for any company as described above for a period of one (1) year prior to undertaking the review of SST system tank integrity assessment work. 2. To meet the requirement for 'qualified,' the IQRPE must be an engineer experienced in examination of tank storage systems. Certification by the National Association of Corrosion Engineers (NACE) is desirable, but not required. 3. To meet the requirement for 'registered professional engineer,' the IQRPE must be registered as a professional engineer with the Washington State Department of Licensing, or by a state which has reciprocity with the State of Washington. Certification(s) of the single-shall tank system integrity assessment report shall be by the following statement unless another statement is agreed to with Ecology: 'I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and all attachments, and that, based on my assessment of the plans and procedures utilized for obtaining this information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.'	June 30, 2002

3.0 SINGLE-SHELL TANK SYSTEM COMPONENT DESCRIPTIONS AND LEAK DETECTION STATUS

The SST system components subject to LDM F&Rs consists of the tanks and ancillary equipment identified in Appendix A. This section describes these SST system components.

The SST system components governed by LDM requirements established by this document include the following:

- 133 SSTs (100 series) (530,000 to 1,000,000 gallons);
- 16 SSTs (200 series) (55,000 gallons);
- 17 inactive/not-in-use MUSTs;
- Numerous at-tank pits (pump, sluice, heel, saltwell, saltwell caisson, diversion and receiving);
- Numerous between-tank pits (diversion boxes, valve, and flush),
- Numerous pipelines; and
- 18 vessels and cells in four miscellaneous structures.

The following SST components are not within the scope of this document and are not governed by the F&Rs in this document.

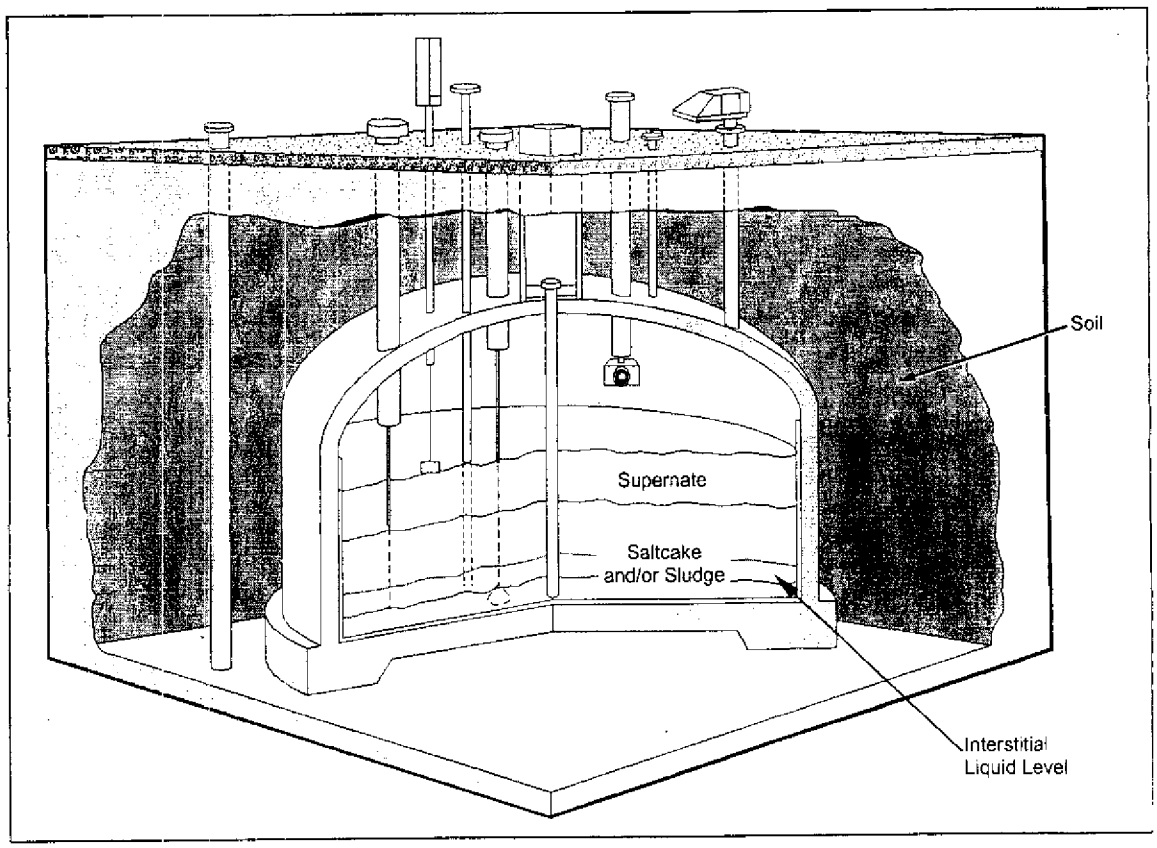
- Control buildings, electrical distribution components, and ventilation components that by design and practice do not store waste. These components have no functions associated with LDM.
- 242-S and 242-T Evaporators. These components currently reside in standby/shutdown Condition III and V, respectively. In Condition III, a facility receives maintenance that allows for its restart, but restart would take more than six months to accomplish. In Condition V, a facility will perform no further operations, and it receives maintenance to allow for decommissioning within 50 years. The actions taken to place these facilities in standby/shutdown minimize their surveillance and maintenance requirements, and minimize the environmental hazards posed by these facilities. Also, these facilities have no anticipated future mission associated with safe waste storage and LDM. Management of the 242-S and -T Evaporators is described on the Silver List Closeout Forms (5.3 and 5.4) (DOE-RL 1996) in which the parties agreed that the evaporators would be listed in the Waste Information Data System and managed as RCRA Past-Practice Units.
- RCRA Past-Practice Unit Components. These units will be addressed through closure requirements.
- *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* Past-Practice Unit Components. These units will be addressed through closure requirements.
- Pumps. Pumps themselves do not have leak detection capabilities. Rather, by engineering design, they drain to structures, such as pits, that do have leak detection capabilities.

Waste contained within the SST system consists primarily of sludge, salt cake, and drainable and non-drainable liquid generated by the following chemical processes:

- Bismuth phosphate ($BiPO_4$) process;
- Reduction-oxidation (REDOX) process;
- Plutonium-uranium extraction (PUREX) process;
- Tributyl phosphate process; and
- B Plant waste fractionation process.

Sludge contains solids precipitated from neutralization of acid waste prior to transfer to the SSTs (e.g., hydrous metal oxides). Salt cake contains various salts formed by evaporation of water from the waste. Drainable liquids exist as supernate and interstitial liquids in the tanks. Non-drainable liquids are bound to the surface of solid particles by capillary action and cannot drain from the waste solids. Figure 3-1 depicts waste forms found in SSTs.

Figure 3-1. Tank Waste in a Single-Shell Tank



Operations and natural processes have created non-homogenous waste. For example, the tanks received additions of non-radioactive chemicals to enhance storage capabilities, some heat-producing radionuclides were removed, and additions of non-radioactive chemicals were made to reduce corrosion of tank liners. Natural processes have caused settling, stratification and segregation of waste components. The 100-series tanks, with the exception of 241-AX Tank Farm, reside in cascades. When the first tank in the cascade filled with waste, it overflowed into successive tanks through pipes penetrating the sidewalls. Cascading in the 100-series SSTs allowed cooling and precipitation of radionuclides. Due to the cascading effect, more solids generally tended to settle out in the first tank in the series with more supernate in the last tanks.

3.1 SINGLE-SHELL TANK SYSTEM COMPONENT GROUPINGS

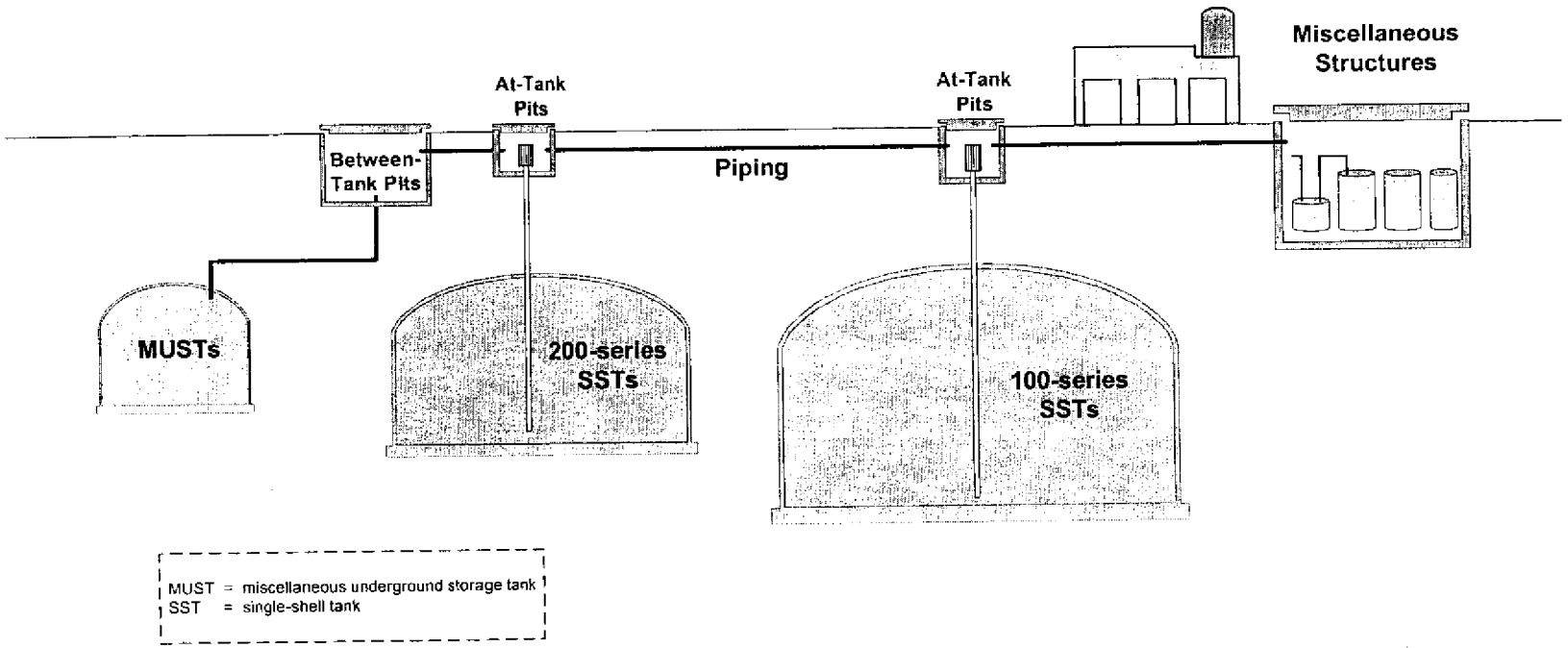
This document organizes SST components into groups to facilitate identification of applicable LDM requirements. Component groups contain items that perform similar functions. Table 3-1 and this section summarize these groups. Figure 3-1 illustrates the SST system and the interrelationship of SST system components.

Table 3-1. Single-Shell Tank Component Groupings

Grouping in Appendix A	Group Elements	Description of Component Group – Report Section #
SSTs	100-series tanks 200-series tanks	3.1.1
MUSTs	Inactive/not-in-use MUSTs	3.1.2
At-tank pits	Pump pits Sluice pits Heel pits Saltwell pits Saltwell caissons Distribution pits Receiving pits	3.1.3
Between-tank pits	Diversions boxes Valve pits Flush pits	3.1.4
Piping	Piping	3.1.5
Miscellaneous structures	Miscellaneous buildings and structures Vaults	3.1.6

MUST = miscellaneous underground storage tank
SST = single-shell tank

Figure 3-2. Relational Diagram of Single-Shell Tank System Components



3.1.1 Single-Shell Tanks

Single-shell tanks consist of underground, reinforced concrete shells with internal liners of mild carbon-steel covering the bottoms and sidewalls (Figure 3-3). The SST farms contain 67 tanks known or assumed to have leaked (HNF-EP-0182, Rev. 166; HNF-4872, Vol. I, Rev. 0) (Table 3-2). The last declaration of a leaking tank occurred in 1994 (Tank T-111).

Figure 3-3. Single-Shell Tank Cross-Section

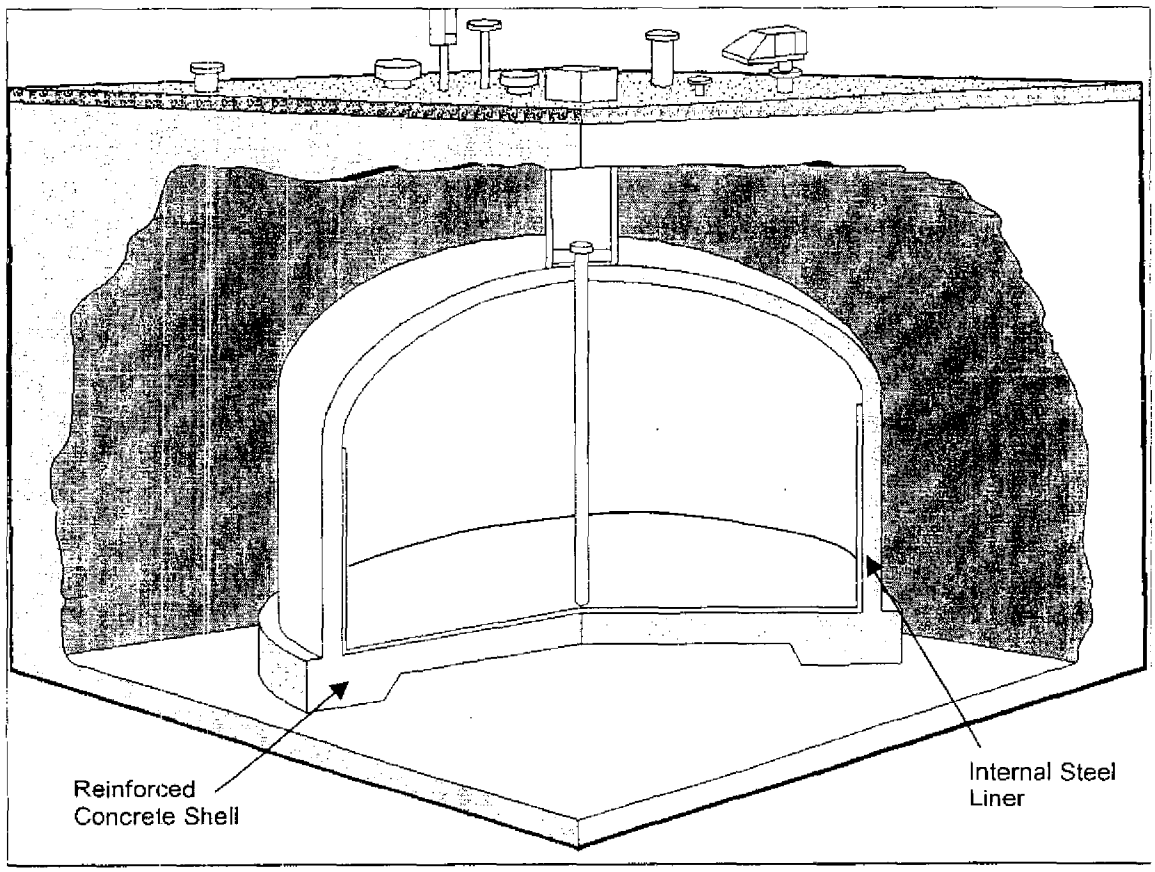


Table 3-2. Single-Shell Tank Leak Volume Estimates (3 Sheets)

Tank	Year Leak Declared	Leak Estimate (gal)	Waste Group / Waste Type
A-103	1987	5,500	Double-shell slurry feed, non-complexed waste and evaporator feed
A-104	1975	500 to 2,500	Sluice, neutralized acid waste, water, and B Plant high-level waste
A-105	1963	10,000 to 277,000	Neutralized acid waste and ion exchange waste
AX-102	1988	3,000	Complex concentrate waste, double-shell slurry feed, and evaporator feed
AX-104	1977	8,000	Non-complexed waste and neutralized acid waste
B-101	1974	8,000	Cladding waste, evaporator bottoms waste and B Plant low-level waste
B-103	1978	8,000	Cladding waste, evaporator bottoms waste, and ion-exchange waste
B-105	1978	8,000	Evaporator bottoms waste and first-cycle decontamination waste
B-107	1980	8,000	First-cycle decontamination waste, evaporator bottoms waste and cladding waste
B-110	1981	10,000	Second-cycle decontamination waste and B Plant cell drainage waste
B-111	1978	8,000	Second-cycle decontamination waste and B Plant cell drainage waste
B-112	1978	2,000	Second-cycle decontamination waste and B Plant cell drainage waste
B-201	1980	1,200	Lanthanum fluoride decontamination waste
B-203	1983	300	Lanthanum fluoride decontamination waste
B-204	1984	400	Lanthanum fluoride decontamination waste
BX-101	1972	8,000	Tributyl phosphate waste and cladding waste
BX-102	1971	70,000	Tributyl phosphate waste and cladding waste
BX-108	1974	2,500	Tributyl phosphate waste and cladding waste
BX-110	1976	8,000	First-cycle decontamination waste and in-tank solidified evaporator bottoms waste
BX-111	1984	8,000	First-cycle decontamination waste, and in-tank solidified evaporator bottoms waste
BY-103	1973	< 5,000	Ferrocyanide-scavenged tributyl phosphate waste and in-tank solidified evaporator bottoms waste
BY-105	1984	8,000	Ferrocyanide-scavenged tributyl phosphate waste and in-tank solidified evaporator bottoms waste

Table 3-2. Single-Shell Tank Leak Volume Estimates (3 Sheets)

Tank	Year Leak Declared	Leak Estimate (gal)	Waste Group / Waste Type
BY-106	1984	8,000	Ferrocyanide-scavenged tributyl phosphate waste and in-tank solidified evaporator bottoms waste
BY-107	1984	15,100	Ferrocyanide-scavenged tributyl phosphate waste and in-tank solidified evaporator bottoms waste
BY-108	1972	< 5,000	Ferrocyanide-scavenged tributyl phosphate waste and in-tank solidified evaporator bottoms waste
C-101	1980	20,000	Tributyl phosphate waste and cladding waste
C-110	1984	2,000	First-cycle decontamination waste and tributyl phosphate waste
C-111	1968	5,500	Ferrocyanide-scavenged tributyl phosphate waste and first-cycle decontamination waste
C-201	1988	550	Hot semi-works waste
C-202	1988	450	Hot semi-works waste
C-203	1984	400	Hot semi-works waste
C-204	1988	350	Hot semi-works waste
S-104	1968	2,4000	REDOX high-level waste
SX-104	1988	6,000	REDOX high-level waste and evaporator bottoms waste
SX-107	1964	< 5,000	REDOX high-level waste
SX-108	1962	2,400 to 35,000	REDOX high-level waste
SX-109	1965	< 10,000	REDOX high-level waste
SX-110	1976	5,500	REDOX high-level waste and REDOX ion-exchange waste
SX-111	1974	500 to 2,000	REDOX high-level waste and REDOX ion-exchange waste
SX-112	1969	30,000	REDOX high-level waste
SX-113	1962	15,000	REDOX high-level waste and diatomaceous earth
SX-114	1972	8,000	REDOX high-level waste and REDOX ion-exchange waste
SX-115	1965	50,000	REDOX high-level waste
T-101	1992	7,500	Cladding waste and mixture of several miscellaneous wastes
T-103	1974	< 1,000	Cladding waste and mixture of several miscellaneous wastes
T-106	1973	115,000	First-cycle decontamination waste and cladding waste
T-107	1984	8,000	Ferrocyanide-scavenged tributyl phosphate waste and first-cycle decontamination waste
T-108	1974	< 1,000	First-cycle decontamination waste and tributyl phosphate waste
T-109	1974	< 1,000	Tributyl phosphate waste and evaporator bottoms waste

Table 3-2. Single-Shell Tank Leak Volume Estimates (3 Sheets)

Tank	Year Leak Declared	Leak Estimate (gal)	Waste Group / Waste Type
T-111	1979, 1994	< 1,000	Second-cycle decontamination waste and lanthanum fluoride decontamination waste
TX-105	1977	8,000	REDOX high-level waste evaporator bottoms waste
TX-107	1984	2,500	REDOX high-level waste evaporator bottoms waste
TX-110	1977	8,000	Evaporator bottoms waste and first-cycle decontamination waste
TX-113	1974	8,000	Evaporator bottoms waste and first-cycle decontamination waste
TX-114	1974	8,000	Evaporator bottoms waste and first-cycle decontamination waste
TX-115	1977	8,000	Evaporator bottoms waste and REDOX high-level waste
TX-116	1977	8,000	Evaporator bottoms waste and first-cycle decontamination waste
TX-117	1977	8,000	Evaporator bottoms waste and first-cycle decontamination waste
TY-101	1973	< 1,000	Ferrocyanide-scavenged first-cycle decontamination waste and evaporator bottoms waste
TY-103	1973	3,000	Tributyl phosphate waste and ferrocyanide-scavenged first-cycle decontamination waste
TY-104	1981	1,400	Tributyl phosphate waste and ferrocyanide-scavenged first-cycle decontamination waste
TY-105	1960	35,000	Tributyl phosphate waste
TY-106	1959	20,000	Tributyl phosphate waste
U-101	1959	30,000	REDOX high-level waste
U-104	1961	55,000	REDOX high-level waste and diatomaceous earth
U-110	1975	5,000 to 8,100	First-cycle decontamination waste and cladding waste
U-112	1980	8,500	Unknown

REDOX = reduction-oxidation process

Waste stored in the SSTs consists of mixed waste containing primarily inorganic compounds and radioactive components. Inorganic compounds include:

- Sodium hydroxide;
- Sodium salts of nitrate, nitrite, carbonate, aluminate, and phosphate; and
- Hydrous oxides of aluminum, iron, and manganese.

Radioactive components in the waste consist primarily of mixed long-lived fission radionuclides (e.g., iodine-129) and actinide elements (e.g., uranium, neptunium, plutonium, thorium, americium). The waste may contain heavy metals (e.g., lead, chromium, cadmium).

Most of the tanks have moderately to strongly alkaline solutions with pH values up to 14. Historically, tank operations maintained a high pH in conjunction with additions of sodium nitrite to limit corrosion of the SST carbon-steel liners, transfer piping, and related process facilities used to handle SST waste. Current operating practices do not allow additions to the SSTs to adjust tank pH.

- **100-Series Tanks**

  One hundred thirty-three of the 149 SSTs have diameters of 75 feet. These tanks have operating volumes of 530,000, 750,000, and 1,000,000 gallons (see Figure 1-3). These tanks collectively make up the 100-series tanks. Appendix A contains a complete listing of all 100-series tanks.

- **200-Series Tanks**

  Sixteen smaller tanks have the same basic design as the 100-series tanks. However, the smaller tanks have diameters of only 20 feet and operating volumes of 55,000 gallons (see Figure 1-3). These tanks collectively make up the 200-series tanks. Appendix A contains a complete listing of all 200-series tanks.

3.1.2 Miscellaneous Underground Storage Tanks

The SST farms contain seventeen MUSTs that are inactive/not-in-use or RCRA regulated. All of these tanks have operating volumes of less than 50,000 gallons. The MUSTs fulfilled a variety of uses: some collected drainage from pits, and others collected facility-generated waste for batch transfer to a more permanent storage facility. The MUSTs follow one of four basic designs: direct-buried concrete, direct-buried steel, steel tanks in vaults or pits, and concrete vaults with steel liners. Many are directly buried in the ground, and most are catch tanks that collect small amounts of waste drained from waste transfer components. Many contain sludge and waste. Appendix A contains a complete listing of these SST system MUSTs.

3.1.3 At-Tank Pits

At-tank pits consist of below-grade concrete structures with removable concrete or steel cover blocks. These pits contain pumps, monitoring equipment, and transfer system connections and piping spools (jumpers) used to interconnect the SST transfer system piping network. By engineering design, pits drain to tanks. All in-use pits involved in waste transfers contain continuously monitored conductivity-based leak detectors. The number and type of pits associated with an SST depends on its function and the type of waste the SST stores. Not all SSTs have all of the at-tank pits described below. Appendix A contains a complete listing of at-tank pits.

- **Pump Pits**

  Pump pits contain equipment for pumping waste out of SSTs. They usually reside over the center of the tank dome.

- **Sluice Pits**

  Sluice pits connected transfer piping to the sluicer assembly during past waste sluicing operations. They reside over off-center tank risers.

- **Heel Pits**

  Heel pits allow for equipment installation in SSTs. They reside over off-center tank risers.

- **Saltwell Pits**

  Saltwell pits allow for installation of saltwell pumps and piping in SSTs. They reside over the tank near the center or off-center.

- **Saltwell Caissons**

  Saltwell caissons consist of large, covered pits over SST tank domes. They allow for the installation of oversized equipment in the tank, including saltwell pumps. They were typically constructed from a section of corrugated metal pipe to create a caisson over the dome to allow for access to the riser. They serve a similar purpose as saltwell pits, but have a different construction.

3.1.4 Between-Tank Pits

Between-tank pits include diversion boxes, valve pits, and flush pits. Appendix A contains a complete listing of between-tank pits.

- **Diversion Boxes**

  Diversion boxes are below-grade, reinforced concrete structures that provide a flexible method of directing liquid waste from multiple inlets to multiple outlets, increasing route flexibility. The top of the diversion box is a concrete cover block that usually extends above grade. The cover blocks vary in thickness from box to box, and some are steel lined. Transfer lines are connected in the diversion box by installing a jumper between the connecting nozzles. Jumpers can be either fixed or flexible.

  Diversion boxes are equipped with leak detection probes; however, the probes are operated only for transfers. The pit drains are connected to catch tanks that collect any potential leakage from the jumper connections. Some transfer lines also drain back to the diversion box, which provides containment for any drained liquids.

- **Valve Pits**

  Valve pits are a form of diversion box and are also located below ground. They were used when transferring waste from multiple tanks at the same time. In the valve pit, the transfer lines of the sending tank are manifolded to the receiver tank line by means of a series of valves and jumper connections. Two-way and three-way valves are built into each rigid jumper assembly to divert the flow in the required direction. Waste also can be routed through the valve pit with stainless-steel flex jumpers. During a transfer, the leak detector in each valve pit in the transfer route is operating and is interlocked to

shutdown pumps if activated. Each valve pit also has a flush line connected to a flush pit or a drain line connected to an underground storage tank.

- **Flush Pits**

  The components for pipeline back flushing and decontamination operations are located in flush pits. In-line back flow preventers protect the flush pit system from contamination resulting from mixed waste back flowing into the flushing system.

3.1.5 Piping

The SST farms in the 200 East and 200 West Areas contain approximately 1,300 pipelines. The piping transferred waste to and from tanks in and among the farms. Piping has a variety of configurations including: single-walled direct buried, concrete-encased, double-wall buried, and more recently temporary aboveground hose-in-hose. Appendix A contains a listing of piping subject to LDM F&Rs.

- **Mission Essential Piping**

  Mission essential piping includes any piping that will or may support interim stabilization of an SST (but excluding retrieval). Mission essential piping has leak detection capability during all transfers until physical disconnection of the system from the mission essential transfer route(s) occurs.

  Mission essential piping gravity drains to tanks (i.e., SSTs and MUSTs) by design, and receives periodic flushing during and after use.

- **Inactive/Not-in-use Piping**

  Inactive/not-in-use piping includes any piping with no current and no expected mission in safe storage or transfer of SST system waste. Inactive/not-in-use piping does not have leak detection capabilities.

3.1.6 Miscellaneous Structures

The following sections identify SST system miscellaneous structure vaults that fall within the scope of the HFFACO Milestone M-23-23 requirements for LDM F&Rs.

Vaults

Vaults consist of shielded enclosures housing waste processing equipment. The vaults operated to collect, clarify, and allow physical and chemical modification of waste before its transfer elsewhere. Appendix A contains a listing of vaults subject to LDM F&Rs.

- **244-AR Vault**

  The 244-AR vault is located north west of the A Tank Farm in the 200 East Area. The vault was designed to receive, treat and transfer PUREX facility tank farm sludge to B Plant for fission product removal; provide interim storage for the PUREX facility acid waste feed to B Plant; and receive and distribute neutralized high-level waste from B Plant. The 244-AR vault waste was transferred to the Double-Shell Tank System per the requirements of HFFACO Milestone M-45-11.

The 244-AR vault has three process cells. Cell 1 has a 43,000-gallon flat bottom stainless-steel tank (244-AR-TK-001); Cell 2 has a 43,000-gallon flat bottom stainless-steel tank (244-AR-TK-002); and Cell 3 has two slope bottom stainless-steel tanks (244-AR-TK-003 and 244-AR TK-004), each with a capacity of 4,800 gallons. Each of the three cells is equipped with a sump to detect leaks in any of the four tanks.

- **244-CR Vault**

The 244-CR vault is an inactive facility that functioned as a lag storage and transfer station from various waste streams including liquid discharge from Hot Semiworks (C Plant) and fission product "crudes" being transported between PUREX and B Plant. The facility also provided lag storage for PUREX acidified sludge in transit to the 244-AR vault and has been used for routing waste transfers from the C Tank Farm to the double-shell tanks (DSTs). The 244-CR vault houses a 50,000-gallon carbon-steel tank (244-TK-CR-001); two 15,000-gallon stainless-steel tanks (244-TK-CR-002 and 244-TK-CR-003); and a 50,000-gallon stainless-steel tank (244-TK-CR-011). All above-grade portions of the facility, including steam and air supply lines, have been removed. Tank 244-TK-CR-003 is currently monitored. None of the other tanks in the vault complex are monitored (RPP-9645, Rev. 0).

4.0 LEAK DETECTION AND MONITORING FUNCTIONS AND REQUIREMENTS

There are several functions related to leak detection that are applied to the components of the SST system based on the requirements of 40 CFR 265. These functions have been developed in response to the regulations and include:

- Detect the leak,
- Contain the leak,
- Respond to the leak, and
- Evaluate the SST system status.

Each of the functions must be accomplished in a manner that meets a specified objective, referred to as a requirement. Examples of requirements include:

- Detect the leak within 24 hours or as soon as practicable,
- Mitigate the effects of the leak as soon as practicable,
- Respond to the leak within 24 hours of detecting the leak, and
- Determine if the waste is compatible with the tank material.

The LDM functions identified in this document apply to the SST system components listed in Appendix A. However, the application of the functions differs depending on the characteristics of the components (e.g., purpose, status, dimensions, waste characteristics). To facilitate application of the functions, this document bins individual SST system groups into components. Component groups perform, or performed, similar functions and have similar characteristics. This document organizes components into two groups. Within these groups, this document further distinguishes between five subgroups to account for important component features:

- Primary containment structures:
  - SSTs,
  - MUSTs, and
  - Vessels and cells in miscellaneous structures.
- Transfer components:
  - Pipes, and
  - Pits.

This document bins primary containment structures into the same group because these components store, or may store, waste by design or practice. Processes for removing pumpable supernate and interstitial liquid waste, called interim stabilization, have been completed for these components. However, in addition to sharing important features, primary containment structures also have notable differences in size, status, and waste characteristics. To facilitate identification of requirements based on the functions, this document creates sub-groups of primary

containment structures that consist of SSTs, MUSTs, and vessels and cells in miscellaneous structures.

Transfer components fall into the same grouping because they facilitate, or facilitated, waste transfers within the SST system, but did not and do not store waste by design or practice except during waste transfers or in abnormal situations (e.g., when a transfer line plugs). To facilitate identification of requirements based on the functions, this document creates sub-groups of transfer components that consist of pits and pipes.

Section 4.1 establishes functions (detect, contain, respond) and requirements for primary containment structures. Section 4.2 establishes functions (detect, contain, respond) for transfer components. Section 4.3 identifies F&Rs for inspecting and evaluating the condition of SST system components (primary containment structures and transfer components) and for performing component maintenance. Section 4.4 identifies requirements for the design of new SST system components. Table 4-1 summarizes the location in this document of F&Rs for all SST system components and includes the following information:

- Identifies the name of the component sub-group (i.e., SSTs, MUSTs, miscellaneous structures, etc.) as described in Section 3.0 of this document;
- Provides a reference to a section in this document that describes the component sub-group;
- Identifies the important features of the sub-group used to assign functions and requirements (referred to as the F&R group), and (for SSTs, MUSTs, and vessels and cells in miscellaneous structures) identifies a figure that provides a breakdown of how many components in each F&R group have these features; and
- Provides a reference to a section in this document that describes the requirements applied to the F&R group.

Figure 4-1 graphically depicts the SST system component sub-groups. Figures 4-2, 4-3, and 4-4 graphically represent the F&R grouping logic, applicable F&Rs, and number of components in each F&R group for SSTs, MUSTs, and vessels and cells in miscellaneous structures, respectively. The assignment of an SST, MUST, vessel or cell to an F&R group is based on the component conditions and is subject to change. Component conditions are routinely monitored. If conditions for a tank change as a result of monitoring, the grouping and monitoring frequency will be reevaluated and recategorized per the requirements established by this document.

Table 4-1. Component Groups and Requirements (3 Sheets)

Group	Description Reference	Functions and Requirements Group	Requirements Reference
SSTs	3.1.1	**Not technically feasible to LDM (i.e., dry waste surface and less than 24 inches of drainable liquid in the tank bottom) and has suspect integrity (see** Figure 4-2) - OR - LDM is technically feasible, meets interim stabilization criteria, intrusion prevention has been completed, and has suspect integrity	4.1.1(A)(1) 4.1.2(A) 4.1.3(A)(1) 4.3.1(A) 4.3.2(A) 4.3.3(A) 4.4(A)
		Not technically feasible to LDM and does not have suspect integrity - OR – LDM is technically feasible, meets interim stabilization criteria,intrusion prevention has been completed and does not have suspect integrity (see Figure 4-2)	4.1.1(A)(2) 4.1.2(A) 4.1.3(A)(2) 4.3.1(A) 4.3.2(A) 4.3.3(A) 4.4(A)
		Intrusion monitoring is technically feasible, meets interim stabilization criteria, and intrusion prevention action has not been completed.(see Figure 4-2)	4.1.1(A)(3) 4.1.2(A) 4.1.3(A)(2) 4.3.1(A) 4.3.2(A) 4.3.3(A) 4.4(A)
		LDM is technically feasible, and does not meet interim stabilization criteria (see Figure 4-2)	4.1.1(A)(3) 4.1.2(A) 4.1.3(A)(3) 4.3.1(A) 4.3.2(A) 4.3.3(A) 4.4(A)
MUSTs	3.1.2	Inactive/not-in-use, and interim stabilized or meets interim stabilization criteria (see Figure 4-3)	4.1.1(B)(1) 4.1.2(B)(2) 4.1.3(B)(1) 4.3.1(A) 4.3.2(B)(1) 4.3.3(A) 4.4(A)
		Inactive/not-in-use, not interim stabilized, and does not meet interim stabilization criteria with a known volume of drainable liquid (see Figure 4-3)	4.1.1(B)(2) 4.1.2(B)(2) 4.1.3(B)(2) 4.3.1(A) 4.3.2(B)(1) 4.3.3(A) 4.4(A)

Table 4-1. Component Groups and Requirements (3 Sheets)

Group	Description Reference	Functions and Requirements Group	Requirements Reference
MUSTs	3.1.2	Mission essential (see Figure 4-3)	4.1.1(B)(2) 4.1.2(B)(1) 4.1.3(B)(2) 4.3.1(A) 4.3.2(B)(2) 4.3.3(A) 4.4(A)
	3.1.2	Inactive/not-in-use and has an indeterminate volume of drainable liquid (see Figure 4-3)	4.1.1(B)(3) 4.1.2(B)(2) 4.3.1(A) 4.3.2(B)(1) 4.3.3(A) 4.4(A)
Miscellaneous structures	3.1.6	Dry cells and inactive/not-in-use and meets interim stabilization criteria (see Figure 4-4)	4.1.1(C)(1) 4.1.2(C)(2) 4.1.3(C)(1) 4.3.1(A) 4.3.2(C) 4.3.3(A) 4.4(A)
		Inactive/not-in-use and does not meet interim stabilization criteria (see Figure 4-4)	4.1.1(C)(2) 4.1.2(C)(2) 4.1.3(C)(2) 4.3.1(A) 4.3.2(C) 4.3.3(A) 4.4(A)
		Mission essential (see Figure 4-4)	4.1.1(C)(2) 4.1.2(C)(1) 4.1.3(C)(2) 4.3.1(A) 4.3.2(C) 4.3.3(A) 4.4(A)
		Inactive/not-in-use and has an indeterminate volume of drainable liquid (see Figure 4-4)	4.1.1(C)(3) 4.1.2(C)(2) 4.3.1(A) 4.3.2(C) 4.3.3(A) 4.4(A)
At-tank and between-tank pits	3.1.3 3.1.4	Inactive/not-in-use	4.2.1(A)(1) 4.2.2(A)(1) 4.2.3(A)(1) 4.3.1(A) 4.3.2(D)(1) 4.3.3(A) 4.4(A)

Table 4-1. Component Groups and Requirements (3 Sheets)

Group	Description Reference	Functions and Requirements Group	Requirements Reference
At-tank and between-tank pits	3.1.3 3.1.4	Mission essential	4.2.1(A)(2) 4.2.2(A)(2) 4.2.3(A)(2) 4.3.1(A) 4.3.2(D)(2) 4.3.3(A) 4.4(A)
Pipes	3.1.5	Inactive/not-in-use	4.2.4(A)(1) 4.2.5(A)(1) 4.2.6(A)(1) 4.3.1(A) 4.3.2(E)(1) 4.3.3(A) 4.4(A)
		Mission essential	4.2.4(A)(2) 4.2.5(A)(2) 4.2.6(A)(2) 4.3.1(A) 4.3.2(E)(2) 4.3.3(A) 4.4(A)

LDM = leak detection and monitoring
MUST = miscellaneous underground storage tank
SST = single-shell tank

Figure 4-1. Single-Shell Tank System Components–Functions and Requirements

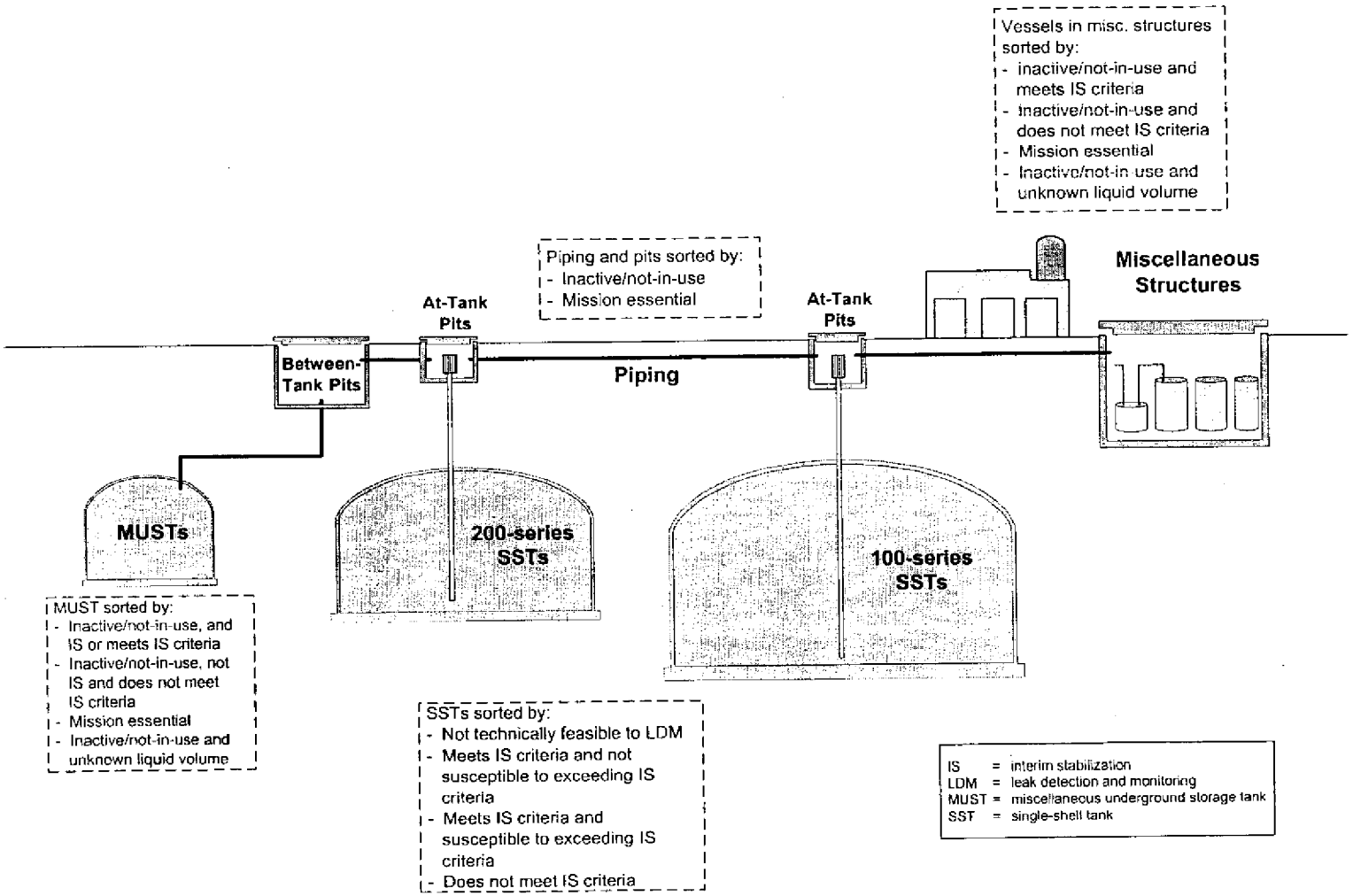


Figure 4-2. Single-Shell Tank Leak Detection and Monitoring Requirements

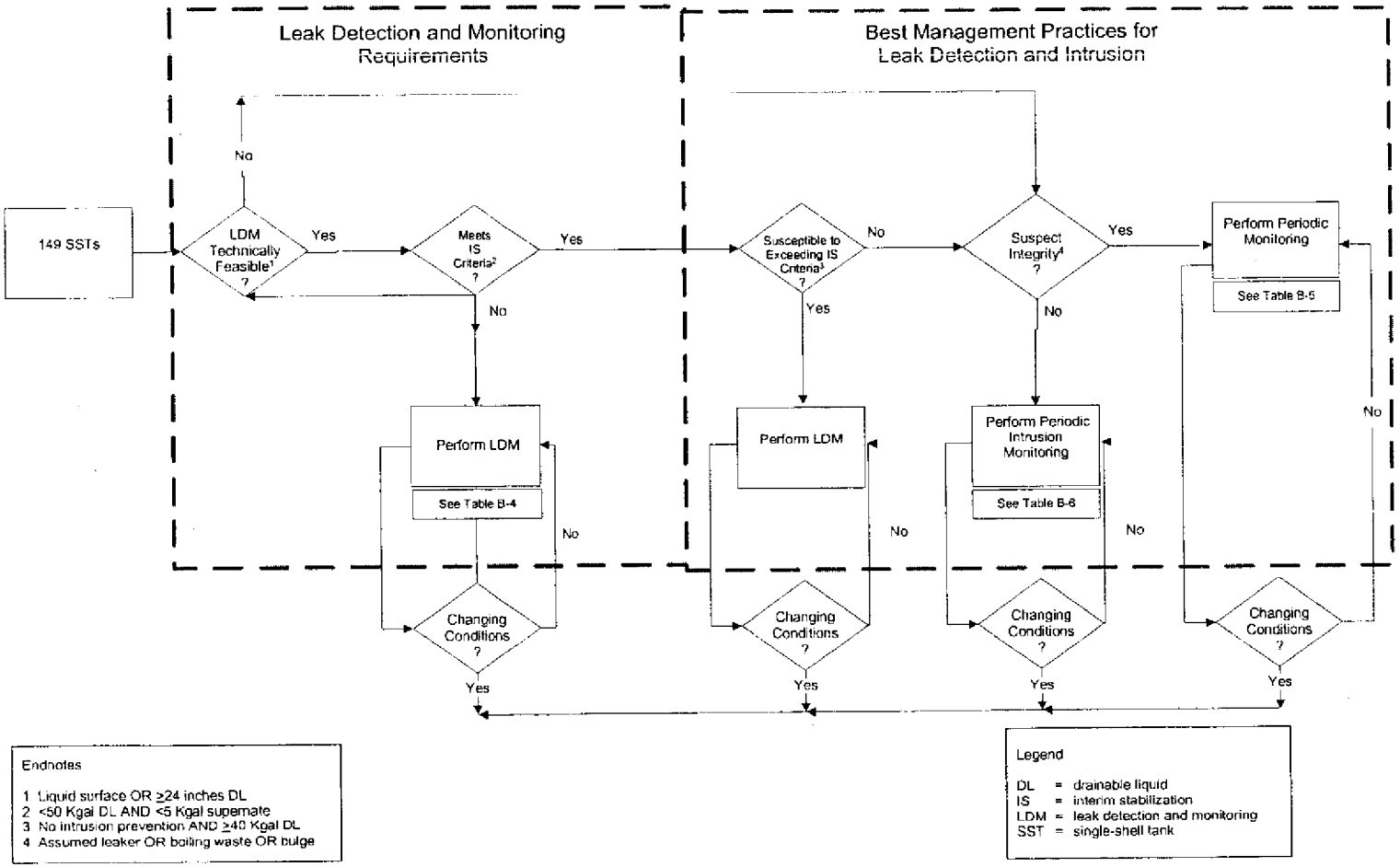


Figure 4-3. Miscellaneous Underground Storage Tank Leak Detection and Monitoring Requirements

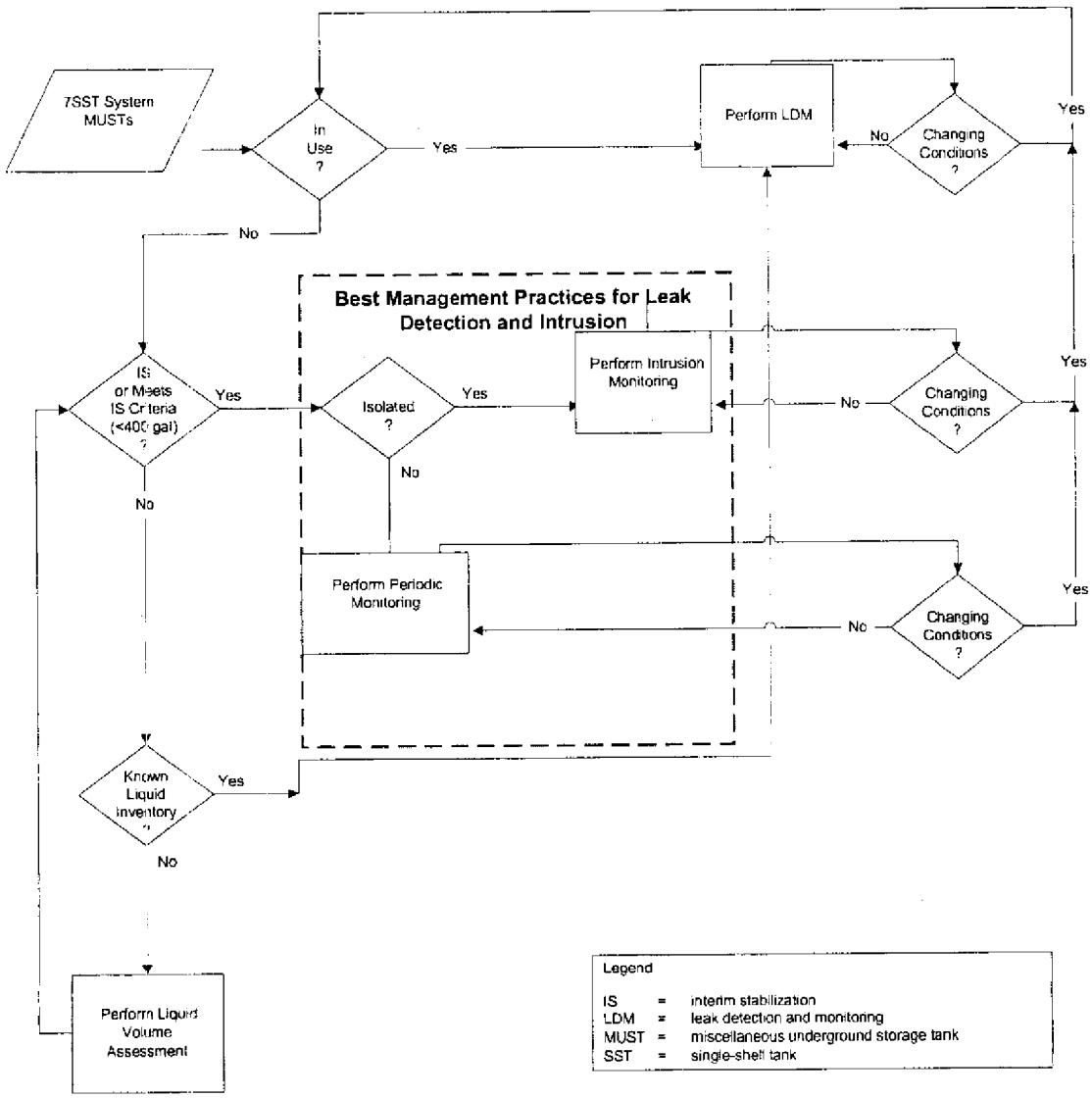
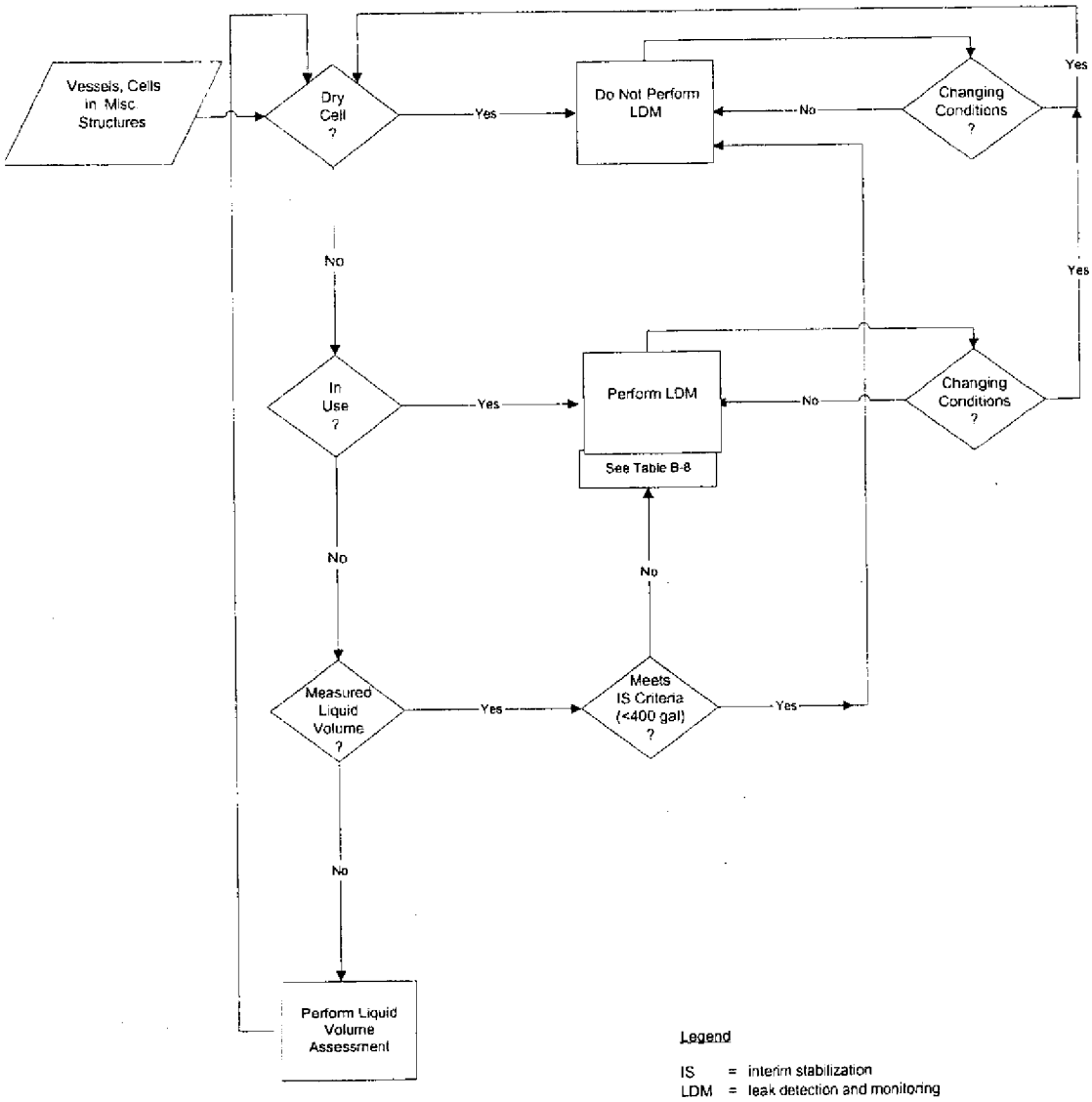


Figure 4-4. Miscellaneous Structure Leak Detection and Monitoring Requirements



4.1 CONTROL SINGLE-SHELL TANK SYSTEM PRIMARY CONTAINMENT LEAKS

4.1.1 Detect Primary Containment Leaks in the Single-Shell Tank System

Regulatory Description: Detect failures of the SST system primary containment structures (WAC 173-303-400; 40 CFR 265.193).

A. Single-Shell Tank Implementing Requirements:

1. Requirement: SSTs that are not technically feasible to LDM (i.e., a dry waste surface, and less than 24 inches of drainable liquid in the tank bottom), or Ecology and the Office of River Protection have agreed that waste retrieval has been completed, shall not require LDM (see Figure 4-2)(See Section 5.0 for best management practice [BMP] monitoring for these tanks) SSTs that are not technically feasible to LDM and have suspect integrity, or SSTs where LDM is technically feasible, meet interim stabilization criteria, intrusion prevention has been completed, and have suspect integrity, or SSTs that Ecology and the Office of River Protection have agreed waste retrieval has been completed, are required to have annual periodic monitoring as a BMP.

   Basis: Currently available technology cannot directly monitor in-tank liquid levels in a tank with a dry waste surface containing less than 24 inches of drainable liquid in the tank bottom (RPP-9645, Rev. 0). See Appendix B for an expanded discussion of this basis.

2. Requirement: SSTs that are not technically feasible to LDM and do not have suspect integrity, or waste retrieval, as agreed to by Ecology and the Office of River Protection, has been completed, or SSTs where LDM is technically feasible, that meet stabilization criteria, intrusion prevention has been completed, and do not have suspect integrity shall have a reduced monitoring frequency due to reduced risk (see Figure 4-2) These tanks are required to have annual intrusion monitoring as a BMP (see Section 5.0 for BMP monitoring for these tanks).

   Basis: The primary response to a leak in an SST is to respond immediately to remove pumpable liquid. Interim stabilization typically removed liquid waste until the retrieval rate drops to 0.05 gpm or less if jet pumping is used. At this point, capillary action prevents most of the remaining liquid from draining from the tank solids. Therefore, interim stabilization has already removed liquids to the extent practical. If a leak occurred in an SST meeting stabilization criteria, the leak would likely occur at a very low rate thus minimizing the extent of the leak. The low leak rate would also make detecting the leak difficult. Moreover, if a leak occurred and it was detected, additional pumping would not result in the removal of liquid beyond established practical limits. See Appendix B for an expanded discussion of this basis.

3. Requirement: SSTs where LDM is technically feasible that do not meet interim stabilization criteria, do not have suspect integrity, and intrusion prevention has been completed, require quarterly LDM or intrusion monitoring. SSTs where LDM is technically feasible and meet the interim stabilization criteria with drainable interstitial liquid >40K gallons and intrusion prevention activity has not been completed shall require weekly LDM or intrusion monitoring (see Figure 4-2). Tanks in which intrusion is detected shall be monitored weekly. The cause of the intrusion will be determined and action taken to stop the intrusion. Liquid from intrusion will be removed during the waste retrieval of the effected tank.

   Basis: Tanks that do not meet interim stabilization criteria require direct measurement of the liquid level for leak monitoring in accordance with WAC 173-303-400 and 40 CFR 265.193. Tanks that are not protected from intrusion must be monitored. See Appendix B for an expanded discussion of this basis.

B. Miscellaneous Underground Storage Tank Implementing Requirements

1. Requirement: Inactive/not-in-use MUSTs that have been stabilized or meet stabilization criteria, were included in the Inactive Miscellaneous Underground Storage Tank (IMUST), or that were not placed in service and did not receive dangerous waste, shall not require LDM (see Figure 4-3). The MUSTs that are physically isolated are required to have annual intrusion monitoring as a BMP and MUSTs that are not physically isolated are required to have annual periodic monitoring as a BMP (see Section 5.0 for BMP monitoring for these tanks).

   Basis: A response to a leak in an stabilized MUST, or MUST containing less than 400 gallons of drainable liquid, could only involve the installation and operation of the emergency pumping system. The MUST liquid levels would not cover the pump inlet, or the pump could not recover liquid from these MUSTs. Therefore, these MUSTs do not require liquid level monitoring. Miscellaneous underground storage tanks have been interim stabilized or meet the interim stabilization criteria and are physically isolated. See Appendix B for an expanded discussion of this basis.

2. Requirement: Inactive/not-in-use MUSTs that have not been stabilized and do not meet interim stabilization criteria shall require LDM. Mission essential MUSTs shall require LDM. Leak detection and monitoring systems shall have the ability to detect leaks at the earliest practicable time allowed by existing detection technology and existing MUST conditions (see Figure 4-3).

   Basis: WAC 173-303-400; 40 CFR 265.193(c)(3). See Appendix B for an expanded discussion of this basis. There are no mission essential MUSTs. MUSTs (catch tanks, double-contained receiving tanks) where LDM is technically feasible that do not meet interim stabilization criteria,

do not have suspect integrity, and intrusion prevention has been completed, require quarterly LDM or intrusion monitoring. MUSTs where LDM is technically feasible and meet the interim stabilization criteria, and intrusion prevention activity has not been completed shall require weekly LDM or intrusion monitoring. Tanks in which intrusion is detected shall be monitored weekly. The cause of the intrusion will be determined and action taken to stop the intrusion. Liquid from intrusion will be removed during the waste retrieval of the effected tank.

3. Requirement: Inactive/not-in-use MUSTs with an indeterminate volume of drainable liquid waste shall have a liquid volume assessment (see Figure 4-3).

   Basis: Inactive/not-in-use MUSTs with indeterminate liquid waste volumes require assessments to determine if they meet stabilization criteria. Based on those assessments, the requirements appropriate to their classification will be imposed. Two inactive/not-in-use MUSTs in the SST system have indeterminate liquid waste volumes. See Appendix B for an expanded discussion of this basis.

C. Vessels and cells in Miscellaneous Structures Implementing Requirements

1. Requirement: Vessels and cells in miscellaneous structure that are empty and inactive/not-in-use vessels and cells in miscellaneous structures that meet interim stabilization criteria shall not require LDM (see Figure 4-4).

   Basis: The inactive/not-in-use vessels and cells in miscellaneous structures do not and will not receive waste. These vessels and cells have been retrieved to the extent possible, or contain less liquid waste than currently retrievable. Leak detection is therefore not required. See Appendix B for an expanded discussion of this basis.

2. Requirement: Inactive/not-in-use vessels and cells in miscellaneous structures that do not meet interim stabilization criteria require LDM. Mission essential vessels and cells in miscellaneous structures require LDM. Leak detection and monitoring systems shall have the ability to detect leaks at the earliest practicable time allowed by existing detection technology and existing vessel and cell conditions (see Figure 4-4).

   Basis: WAC 173-303-400; 40 CFR 265.193(c)(3). See Appendix B for an expanded discussion of this basis. Inactive vessels and cells in miscellaneous structures where LDM is technically feasible that do not meet interim stabilization criteria and intrusion prevention has been completed, require quarterly LDM or intrusion monitoring. Inactive vessels and cells in miscellaneous structures where LDM is technically feasible and meet the interim stabilization criteria and intrusion prevention activity has not been completed shall require weekly LDM or intrusion monitoring. Tanks in which intrusion is detected shall be monitored weekly. The cause of the intrusion will be determined and action taken to

stop the intrusion. Liquid from intrusion will be removed during the waste retrieval of the effected tank.

3. Requirement: Inactive/not-in-use vessels and cells in miscellaneous structures with an indeterminate volume of drainable liquid waste shall have a liquid volume assessment (see Figure 4-4).

   Basis: Inactive/not-in-use vessels and cells in miscellaneous structures with indeterminate liquid waste volumes require a liquid volume assessment to determine if they meet interim stabilization criteria because they contain less than 400 gallons of liquid waste. Based on those assessments, the requirements appropriate to their classification will be imposed. See Appendix B for an expanded discussion of this basis.

4.1.2 Contain Primary Containment Leaks in the Single-Shell Tank System

Regulatory Description: Contain the release of hazardous waste or hazardous constituents to the environment (WAC 173-303-400; 40 CFR 265.193).

A. Single-Shell Tank Implementing Requirements:

1. Requirement: All SSTs shall have a tank integrity assessment by an independent, qualified, registered professional engineer in accordance with WAC 173-303-400 and 40 CFR 265.193(i)(2) as implemented by the requirements established in HFFACO Milestone M-23-24. Single-shell tanks shall not require secondary containment.

   Basis: WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to retrieval of the waste in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment in the implementing requirement.

B. Miscellaneous Underground Storage Tank Implementing Requirements

1. Requirement: All mission essential MUSTs shall have a tank integrity assessment by an independent, qualified, registered professional engineer in accordance with WAC 173-303-400 and 40 CFR 265.193(i)(2) as implemented by the requirements established in HFFACO Milestone M-23-24. Miscellaneous underground storage tanks shall not require secondary containment.

   Basis: WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed

to closure of the SST system in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment described in the implementing requirement. Currently, the SST system contains no mission essential MUSTs.

2. Requirement: Inactive/not-in-use MUSTs shall not require secondary containment as specified by WAC 173-303-400 and 40 CFR 265.193.

   Basis: WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to closure of the SST system in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment in the implementing requirement. Inactive/not-in-use MUSTs will not have secondary containment or integrity examinations for the following reasons: First, inactive/not-in-use MUSTs do not and will not receive waste. Second, the DOE already has plans to retrieve and close the tanks in accordance with the SST System Closure Work Plan (DOE/RL-89-16, Rev. 1). And third, significant technical and cost considerations preclude providing secondary containment or integrity examinations.

C. Vessels and Cells in Miscellaneous Structures Implementing Requirements

1. Requirement: Mission essential vessels and cells in miscellaneous structures shall not require secondary containment. Mission essential vessels and cells in miscellaneous structures shall have a tank integrity assessment performed by an independent, qualified, registered professional engineer in accordance with WAC 173-303-400 and 40 CFR 265.193(i)(2) as implemented by the requirements established in HFFACO Milestone M-23-24.

   Basis: WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to closure of the SST system in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment described in the implementing requirement. Currently, the SST system contains no mission essential vessels or cells in miscellaneous structures.

2. Requirement: Inactive/not-in-use vessels and cells in miscellaneous structures shall not require secondary containment as specified by WAC 173-303-400 and 40 CFR 265.193.

Basis: WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to closure of the SST system in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment in the implementing requirement. Inactive/not-in-use vessels and cells in miscellaneous structures will not have secondary containment or integrity examinations for the following reasons. First, inactive vessels and cells in miscellaneous structures do not, and will not, receive waste. Second, vessels and cells in miscellaneous structures have been, or will be, placed in safe standby waiting decommissioning and closure. And third, significant technical and cost considerations preclude providing secondary containment or integrity examinations.

4.1.3 Respond to Primary Containment Leaks in the Single-Shell Tank System

Regulatory Description: Remove from service tank systems or secondary containment in response to a leak, or to the result of an assessment that finds any portion of the tanks unfit for use (WAC 173-303-400; 40 CFR 265.196).

A. Single-Shell Tank Implementing Requirements:

1. Requirement: SSTs with a dry waste surface, and less than 24 inches of drainable liquid in the tank bottom shall not require responses to leaks (see Section 5.0 for BMP monitoring for these tanks).

   Basis: Currently available technology cannot directly monitor in-tank liquid levels in a tank with a dry waste surface containing less than 24 inches of drainable liquid in the tank bottom (RPP-9645, Rev. 0). The inability to directly monitor in-tank liquid levels precludes effective leak detection and leak response. See Appendix B for an expanded discussion of this basis.

2. Requirement: SSTs that meet interim stabilization criteria shall not require responses to leaks (see Section 5.0 for BMP monitoring for these tanks).

   Basis: Currently developed or available technologies do not exist for removing additional liquid from a leaking tank meeting interim stabilization criteria, other than total waste retrieval already addressed in the HFFACO Milestone M-45-00. The interim stabilization criteria acknowledge the limitations of further liquid removal from SSTs that meet stabilization criteria. Since the interim stabilization process has already removed all liquid that existing tank farm pumping systems can remove, these tanks meet the intent of the regulations while they wait for retrieval.

   See Appendix B for an expanded discussion of this rationale.

3. Requirement: SSTs that do not meet interim stabilization criteria require the following responses to leaks: (a) Remove the tank from service; (b) Immediately contain and inspect visible releases to the environment from tank systems; (c) Report leaks to Ecology within 24 hours of their detection unless the hazardous waste leak or spill involves 1 pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.

   Basis: WAC 173-303-400; 40 CFR 265.196. Tanks that do not meet interim stabilization criteria require installation and operation of the emergency pumping system as soon as practicable upon detecting a leak in accordance with the emergency pumping plan. See Appendix B for an expanded discussion of this basis.

B. Miscellaneous Underground Storage Tank Implementing Requirements

1. Requirement: Inactive/not-in-use MUSTs that have been stabilized or meet interim stabilization criteria shall not require responses to leaks (see Section 5.0 for BMP monitoring for these tanks).

   Basis: A response to a leak in an stabilized MUST, or a MUST containing less than 400 gallons of drainable liquid, could only involve the installation and operation of the emergency pumping system. The MUST liquid levels would not cover the pump inlet, or the pump could not recover liquid from these MUSTs. See Appendix B for an expanded discussion of this basis.

2. Requirement: Inactive/not-in-use MUSTs that have not been interimstabilized and do not meet interim stabilization criteria require responses to leaks. Mission essential MUSTs require responses to leaks. The response to a leak will: (a) Remove the MUST from service; (b) Remove pumpable liquid from the MUST at the earliest practicable time; (c) Immediately contain and inspect visible releases to the environment from tank systems; (d) Report leaks to Ecology within 24 hours of their detection unless the hazardous waste leak or spill involves 1 pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.

   Basis: WAC 173-303-400; 40 CFR 265.196(a) through (d). The SST system currently has no mission essential MUSTs. See Appendix B for an expanded discussion of this rationale.

C. Vessels and Cells in Miscellaneous Structure Implementing Requirements

1. Requirement: Inactive/not-in-use vessels and cells in miscellaneous structures that meet interim stabilization criteria shall not require responses to leaks.

   Basis: The inactive/not-in-use vessels and cells in miscellaneous structures do not and will not receive waste, and have been or will be

placed in safe standby waiting decommissioning and closure. These vessels and cells only contain volumes of drainable liquids at or below the limits that can be practically retrieved by existing tank farm pumping systems (i.e., 400 gallons). See Appendix B for an expanded discussion of this basis.

2. Requirement: Inactive/not-in-use vessels and cells in miscellaneous structures that do not meet interim stabilization criteria shall require responses to leaks. Mission essential vessels and cells in miscellaneous structures shall require responses to leaks. The response to a leak will: (a) Remove the system from service; (b) Remove pumpable liquid from the system at the earliest practicable time; (c) Immediately contain and inspect visible releases to the environment from vessels and cells; (d) Report leaks to Ecology within 24 hours of their detection unless the hazardous waste leak or spill involves 1 pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.

   Basis: WAC 173-303-400; 40 CFR 265.196(a) through (d). See Appendix B for an expanded discussion of this rationale.

4.2 CONTROL SINGLE-SHELL TANK SYSTEM TRANSFER COMPONENT LEAKS

4.2.1 Detect Waste Leakage within At-Tank Pits and Between-Tank Pits

Regulatory Description: Detect leakage from failures within at-tank pits and between-tank pits (WAC 173-303-400; 40 CFR 265.193).

A. Implementing Requirements:

1. Requirement: Inactive/not-in-use at-tank and between-tank pits shall not require LDM.

   Basis: At-tank and between-tank pits provide secondary containment for transfer systems contained within the pits and are designed to drain liquids to tanks. Transfer system components that are inactive/not-in-use have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. If not in use, the inactive/not-in-use transfer system cannot receive or otherwise transfer waste; therefore, the inactive/not-in-use pits have no opportunity to receive leakage from these unused transfer system components.

2. Requirement: When in use, mission essential at-tank and between-tank pits will have direct, in-tank liquid level monitoring instruments capable of detecting leaks within 24 hours, or at the earliest practicable time if existing detection technology or site conditions will not allow detection of a release within 24 hours.

Basis: WAC 173-303-400; 40 CFR 265.193(c)(3).

4.2.2 Contain Waste Leakage within At-Tank Pits and Between-Tank Pits

Regulatory Description: Contain leaks in transfer systems in order to prevent the release or migration of wastes or hazardous constituents to the soil, groundwater, or surface water (WAC 173-303-400; 40 CFR 265.193).

A. Implementing Requirements:

1. Requirement: Inactive/not-in-use at-tank and between-tank pits shall not require secondary containment.

   Basis: At-tank and between-tank pits provide secondary containment for transfer systems contained within the pits and are designed to drain liquids to tanks. Transfer systems that are inactive/not-in-use have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. If not in use, the transfer system cannot receive or otherwise transfer waste. The inactive/not-in-use pits have no opportunity to contain leakage from these unused transfer system components. Therefore, application of the requirement for secondary containment is not appropriate based on current and future system configuration.

2. Requirement: When in-use, mission essential at-tank and between-tank pits act as secondary containment for waste transfers, and will have direct, in-tank liquid level monitoring instruments to detect and prevent migration of waste or accumulated liquid out of the tank to the soil, groundwater, or surface water at any time while in use. In-use, mission essential at-tank and between-tank pits will have the ability to collect, contain or drain releases that drain to them until removal of the collected material.

   Basis: WAC 173-303-400; 40 CFR 265.193(a), (b), and (e).

4.2.3 Respond to Waste Leakage in At-Tank Pits and Between-Tank Pits

Regulatory Description: Remove from service the tank system primary containment system in response to a leak, or the result of an assessment that finds any portion of the pits unfit for use (WAC 173-303-400; 40 CFR 265.196).

A. Implementing Requirements:

1. Requirement: Inactive/not-in-use at-tank and between-tank pits shall not require responses to leaks.

   Basis: At-tank and between-tank pits provide secondary containment for transfer systems contained within the pits and are designed to drain liquids to tanks. Inactive/not-in-use pits have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. While inactive/not-in-use,

the transfer systems cannot receive or otherwise transfer waste; therefore, the inactive/not-in-use pits have no opportunity to contain leakage from these unused transfer system components. Therefore, application of the requirement for responses to leaks is not appropriate based on current and future system configuration.

2. Requirement: When in use, mission essential at-tank and between-tank pits serve as secondary containment for waste transfers, and will have direct, in-pit liquid level monitoring instruments to detect and prevent migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time while in use. When in use, mission essential at-tank and between-tank pits will have the ability to collect, contain or drain releases that drain to them until removal of the collected material.

   Basis: WAC 173-303-400; 40 CFR 265.196(a), (b) and (e).

4.2.4 Detect Leaks in Single-Shell Tank System Piping

Regulatory Description: Detect failures of the SST system piping (WAC 173-303-400; 40 CFR 265.193).

A. Implementing Requirements:

1. Requirement: Inactive/not-in-use piping shall not require LDM.

   Basis: Transfer systems that are inactive/not-in-use have been or will be physically or administratively isolated from the mission essential transfer systems in accordance with the tank farm procedures. While inactive/ not-in-use, the transfer system cannot receive or otherwise transfer waste. Therefore, application of the requirement for LDM is not appropriate based on current and future system configuration.

2. Requirement: When in use, mission essential piping shall have systems in the pits at each end capable of detecting failures of the transfer system within 24 hours or at the earliest practicable time if existing detection technology or site conditions will not allow detection of a release within 24 hours.

   Basis: WAC 173-303-400; 40 CFR 265.193(c)(3).

4.2.5 Contain Waste Leakage within Piping Secondary Containment

Regulatory Description: Contain leaks in piping in order to prevent the release or migration of wastes or hazardous constituents to the soil, groundwater, or surface water (WAC 173-303-400; 40 CFR 265.193).

A. Implementing Requirements:

1. Requirement: Inactive/not-in-use piping shall not require secondary containment.

   Basis: The SST system piping was designed and constructed prior to RCRA and does not have compliant secondary containment (other than when it passes through pits). Transfer systems that are not in use have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. While inactive/not-in-use, the transfer system cannot receive or otherwise transfer waste. Therefore, application of the requirement for secondary containment is not appropriate based on current and future system configuration.

2. Requirement: When in use, mission essential piping shall have either: (a) Secondary containment designed, installed, and operated to prevent any migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use, ***OR*** (b) Pressure testing prior to first use and at least annually thereafter when in use.

   Basis: WAC 173-303-400; 40 CFR 265.193(a); 40 CFR 265.193(i)(2).

4.2.6 Respond to Leakage in Single-Shell Tank System Transfer Piping

Regulatory Description: Remove from service the tank system primary containment system in response to a leak, or the result of an assessment that finds any portion of the pits unfit for use (WAC 173-303-400; 40 CFR 265.196).

A. Implementing Requirements:

1. Requirement: Inactive/not-in-use piping shall be isolated from in-use transfer systems.

   Basis: Transfer piping that is inactive/not-in-use must be physically or administratively isolated from in-use transfer systems (tank farm procedures).

2. Requirement: Mission essential piping that leaks requires the following response: (a) Cease waste transfers and remove the leaking section of piping from service; (b) Remove pumpable liquid at the earliest practicable time; (c) Immediately contain and inspect visible releases to the environment (pit leak detection on double-encased transfer lines satisfies this requirement); (d) Report leaks to Ecology within 24 hours of

their detection unless the hazardous waste leak or spill involves 1 pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.

Basis: WAC 173-303-400; 40 CFR 265.196(a) through (e).

4.3 INSPECTIONS AND EVALUATIONS OF THE SINGLE-SHELL TANK SYSTEM

Regulatory Description: Determine if each existing tank system without secondary containment leaks or is unfit for use (HFFACO Milestone M-23-24).

4.3.1 Assess System Integrity

Regulatory Description: Determine whether mission essential tank systems without secondary containment are leaking or unfit for use. Obtain and keep on file a written assessment reviewed and certified by an independent, qualified, registered professional engineer attesting to the tank system's integrity. The assessment must determine if the tank system has an adequate design, and sufficient structural compatibility with waste stored or treated, to ensure it will not collapse, rupture, or fail. Perform an assessment that considers: design standards used to construct the tank and ancillary equipment; hazardous characteristics of waste handled; existing corrosion protection measures; and the age of the tank system (HFFACO Milestone M-23-24).

A. Implementing Requirements:

1. Requirement: Perform integrity assessment, and maintain associated documents, in accordance with HFFACO Milestone M-23-24.

   Basis: HFFACO Milestone M-23-24.

2. Requirement: Retrieve SST system waste in accordance with HFFACO Milestone M-45-00.

   Basis: HFFACO Milestone M-45-00.

4.3.2 Perform Single-Shell Tank System Inspections

Regulatory Description: Inspect the following at least once each operating day in single-shell tank farms in which transfers are occurring, and document inspection results in the facility operating record: overfill/spill control equipment to ensure good working order; aboveground portions of the system to detect corrosion or releases; monitoring and leak detection equipment to ensure tank systems operate according to design; construction materials and the surrounding area to detect erosion or signs of releases (WAC 173-303-400; 40 CFR 265.195[a]). If active waste transfers are NOT in progress, the inspections will be performed once per calendar week (Monday through Sunday)

A. Single-Shell Tank Implementing Requirements

1. Requirement: All SSTs shall receive a daily or weekly inspection in accordance with tank farm procedures.

   Basis: Tank farm procedures.

B. Miscellaneous Underground Storage Tank Implementing Requirements

1. Requirement: Inactive/not-in-use MUSTs shall not require daily inspections.

   Basis: Inactive MUSTs do not and will not receive waste. These tanks have been removed from service. Therefore, inactive/not-in-use MUSTs do not require daily inspections based on current and future system configuration.

2. Requirement: When in use, for waste transfers mission essential MUSTs shall receive the following inspections daily, and have the results documented in the facility operating record: (a) Inspect overfill/spill control equipment to ensure good working order; (b) Inspect aboveground portions of the system to detect corrosion or releases; (c) Gather data monitoring and leak detection equipment to ensure tank systems operate according to design; and (d) Inspect construction materials and the surrounding area to detect erosion or signs of releases.

   Basis: WAC 173-303-400; 40 CFR 265.195(a).

C. Vessels and Cells in Miscellaneous Structure Implementing Requirements

Requirement: Vessels and cells in Miscellaneous Structures shall receive periodic inspections in accordance with tank farm procedures.

Basis: Tank farm procedures.

D. At-Tank and Between-Tank Pits Implementing Requirements

1. Requirement: Inactive/not-in-use at-tank and between-tank pits shall not require daily inspections.

   Basis: Inactive/not-in-use at-tank and between-tank pits are not involved in the conveyance of waste and have been, or will be, physically isolated from the in-use transfer system. Therefore, at-tank and between-tank pits do not require daily inspection based on current and future system configuration.

2. Requirement: When in use for waste transfers, mission essential at-tank and between-tank pits will receive the following inspections daily, and have the results documented in the facility operating record: (a) Inspect overfill/spill control equipment to ensure good working order; (b) Inspect aboveground portions of the system to detect corrosion or releases; (c) Gather data from monitoring and leak detection equipment to ensure tank systems operate according to design; and (d) Inspect construction materials and the surrounding area to detect erosion or signs of releases.

Basis: WAC 173-303-400; 40 CFR 265.195(a).

E. Piping Implementing Requirements

1. Requirement: Inactive/not-in-use piping shall not require daily inspections.

   Basis: The 200 East and 200 West Areas contain extensive networks of piping including approximately 1,300 individual transfer lines. The inactive/not-in-use piping has been isolated from the in-use transfer systems. These inactive/not-in-use transfer lines contain a variety of piping configurations including single-walled direct buried, concrete encased, double-wall buried, and aboveground hose-in-hose. Typically, transfer piping was designed to self-drain to pits and pits to drain to MUSTs. In addition, line flushes occurred throughout the transfer campaigns at regular intervals and at the completion of the campaign removing a majority of the constituents of concern from the transfer line. Therefore, inactive/not-in-use piping does not require daily inspection based on current and future system configuration.

2. Requirement: When in use for waste transfers, mission essential piping will receive the following daily inspections and have the results documented in the facility operating record: (a) Inspect overfill/spill control equipment to ensure good working order; (b) Inspect aboveground portions of the system to detect corrosion or releases; (c) Gather data from monitoring and leak detection equipment to ensure tank systems operate according to design; and (d) Inspect construction materials and the surrounding area to detect erosion or signs of releases.

   Basis: WAC 173-303-400; 40 CFR 265.195(a).

4.3.3 Corrective Maintenance

Regulatory Description: Perform repairs on tank systems that leaked or are determined unfit for use prior to returning the tank system to service. This includes filing notification reports on the leaking/unfit for use tank system and certification of the repairs to the tank system performed (WAC 173-303-400; 40 CFR 265.196(d), (e) and (f)).

A. Implementing Requirements:

1. Requirement: Perform repairs on leaking and not-in-service tank systems prior to returning them to service. Report any release to the environment to Ecology within 24 hours of its detection unless the hazardous waste leak or spill is less than or equal to 1 pound and immediately contained and cleaned-up. File notification reports satisfying the requirements of WAC 173-303-400 and 40 CFR 265.196(d)(3) within 30 days of the detection of a release to the environment.

   Basis: WAC 173-303-400; 40 CFR 265.196(d).

2. Requirement: Retrieve SST system waste in accordance with HFFACO Milestone M-45-00.

   Basis: HFFACO Milestone M-45-00.

4.4 DESIGN AND CONSTRUCTION

Regulatory Description: Design, install, and operate secondary containment systems to prevent any migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use of the tank system. Design or operate secondary containment systems to contain 100% of the capacity of the largest tank within its boundary (WAC 173-303-400; 40 CFR 265.193).

A. Implementing Requirements

1. Requirement: New structures, systems, and components added to the SST system shall have secondary containment in accordance with WAC 173-303-400 and 40 CFR 265.193.

   Basis: WAC 173-303-400; 40 CFR 265.193.

5.0 CURRENT SINGLE-SHELL TANK SYSTEM MONITORING

The current SST system LDM program addresses LDM during pre-retrieval and post-retrieval waste storage and isolation, and interim stabilization activities. It does not address LDM during SST retrieval covered by the HFFACO M-45-00 Milestone.

The SSTs have already undergone isolation and/or interim stabilization. Isolation involves sealing off a tank to reduce the probability that liquid will enter the tank. Interim stabilization processes removed pumpable liquid from a tank.

Milestone M-23-22-T01, "Submit Document Identifying and Describing DOE's Existing SST In-Tank Surveillance and Monitoring Program," of the HFFACO required identification and description of the existing SST in-tank surveillance and monitoring program. The *Single-Shell Tank System Surveillance and Monitoring Program* (RPP-9645, Rev. 0) describes these processes in detail. Section 5.1 briefly describes the procedures and methods used to accomplish these processes. Sections 5.2 and 5.3 briefly describe the monitoring capabilities of SST support systems.

5.1 CURRENT SINGLE-SHELL TANK SYSTEM LEAK DETECTION AND MONITORING

5.1.1 In-Tank Leak Detection

Monitoring for leaks in the SST system is accomplished through in-tank detection systems. In-tank systems provide the ability to monitor in-tank conditions to determine if a leak event has occurred. The SST in-tank leak detection program operates on the assumption that liquid or semi-liquid waste surfaces will decrease in response to a leak, but rigid or solid surfaces (i.e., dry) will not. Liquid surfaces are further broken down into three categories: liquid, partial liquid, and slurry (RPP-9645, Rev. 0). Selection of leak detection methods depends, in part, on the type of waste surface.

One or more of the following instruments monitor tanks that have liquid waste surfaces for leaks.

- **ENRAF™[1] Level Gauges**

  The ENRAF™ gauge is the most accurate level gauge currently used in the tank farms. It tracks level changes in tank waste by using a load cell to monitor the buoyancy of a displacer. It lowers the displacer into the tank until it encounters an upward force from a solid or liquid surface, at which point it stops. It then tracks the position of the displacer, and reports the level of the solid or liquid surface it has contacted. For the purposes of leak detection, the ENRAF™ gauge needs a free liquid surface below the displacer. Two types of ENRAF™ gauges exist: manual and automatic. Operators performing rounds may manually read the output from either the manual or automatic type during rounds. In addition, the output from the automatic type is collected electronically.

[1] ENRAF is a trademark of the ENRAF Corporation, Houston, Texas.

In some cases, ENRAF™ gauges are used in tanks with dry waste surfaces for intrusion monitoring. An intrusion is detected when the liquid level in the tank rises above the dry waste surface.

- **Manual Tape**

  The manual tape (MT) consists of a measuring tape and plummet. The tape and plummet form an electrical circuit connected to a continuity meter. The tape and plummet are manually lowered into the tank until they contact a conductive surface (i.e., tank waste). In open air, the circuit remains open and the continuity meter displays no current flow. Contacting the waste surface closes the circuit, as indicated on the continuity meter. The level indicated on the tape indicates the level of the waste. To work properly, the plummet must contact a conductive waste surface. Because dry waste surfaces conduct electricity poorly, MTs do not work well in tanks with dry waste surfaces.

- **Liquid Observation Wells**

  Liquid observation wells (LOW) provide leak detection capabilities in tanks with solid waste surfaces. A LOW consists of a 3.5-inch outer diameter tube capped at the bottom and inserted through the waste so the cap rests a nominal 2 inches from the tank bottom, up to several feet from the bottom. The top hangs from a riser flange and is accessible from the surface.

  Neutron or gamma radiation scans taken from inside the LOW establish the interstitial liquid level, indicated by a sudden change in the neutron or gamma counts. A plot tracks the interstitial liquid level against an approved baseline to identify unexpected level losses and significant trend changes.

- **In-Tank Intrusion Detection**

  The same systems used to detect tank leaks also detect tank intrusions. However, a detection of an intrusion measures an increase in waste levels in response to an intrusion, not a decrease in response to a leak.

  The same logic that applies to leak detection also applies to selecting systems for intrusion detection, except that surface level sensing systems will also work for intrusion detection in tanks with solid waste surfaces. These systems will work because a large intrusion may cause an increase in the surface level, whereas a leak will not result in a corresponding decrease in the surface level.

  For SSTs with dry waste surfaces and no LOWs, surface-level sensing systems and, on an as needed basis, photographic inspections provide intrusion-monitoring options.

5.1.2 Monitoring in Single-Shell Tank Ancillary Systems

Single-shell tank ancillary systems are monitored through conductivity-based leak detectors, pressure tests, material balance processes, and operator observations. This section briefly describes these processes.

- **Conductivity-Based Leak Detectors in Transfer Systems**

  Conductivity-based leak detectors have two metal elements. When liquid shorts out the elements at the tip of the detector, the connection allows current flow. That current flow opens a relay, sending an alarm. These systems have local audible and visual annunciators. Some systems also have computer monitoring and interlocks that will shut down all transfer activities in the event of an alarm. Systems without computer monitoring and interlocks require manual shutdown by an operator within 30 minutes.

  Prior to each transfer, the system receives testing by opening the relay to verify that the alarm responds properly, and the pumps shut down when interlocked.

- **Direct-Buried Transfer Line Pressure Tests**

  Direct-buried transfer lines are pressure tested prior to being placed in service. Un-encased transfer lines also receive retesting on an annual basis, as long as the transfer continues. The line is filled with water to the required pressure, and the isolation valves are closed on both ends, trapping the pressure. The internal pressure is monitored for the designated period of time, and if the pressure is maintained, the line is satisfactory for use. Any pressure drop that exceeds the tolerance would cause the line to fail.

- **Hose-in-Hose Pressure Tests**

  The primary (inside) hose is pressure tested at the vendor's site before shipping. The primary hose in aboveground transfer lines comprised of multiple segments receives pressure testing in the field after installation. The drainage from the secondary (annular) hose is routed to the nearest pit. If the primary hose were to leak, the fluids would enter the secondary hose and drain to the pit, where the pit leak detector would alarm.

- **Material Balance Process**

  All fluids pumped out of an SST are measured. The receiver tank is typically a double-contained receiver tank or a DST, which shows a corresponding increase in level. The volume sent and the volume received is compared, and any discrepancies that exceed a predetermined value deemed to be acceptable are identified as a potential leak or instrumentation problem. An investigation is immediately initiated. The predetermined value depends on the volume of the system and the resolution of the instrumentation used.

- **Operator Inspections**

  Operators make inspections (called rounds) to assess the general condition of SST farm components on a daily or weekly basis. Operator inspections ensure: (a) Appropriate attention to facility conditions, and (b) Detection of abnormal conditions or adverse trends before structures, systems, and components malfunction or fail. They provide for verification of key equipment parameters and equipment performance indicators. Operator inspections allow operations personnel to provide prompt notifications to supervisory personnel when operators encounter unusual or unexpected situations. These processes ensure that equipment problems receive the proper attention.

Daily inspections include physical observations of things such as the following:

- Screens,
- Ventilation systems,
- Isolation valve positions,
- Water meters,
- Alarms status and condition,
- Thermocouple readings (when not collected electronically),
- Level measurements in pits and tanks other than SSTs, and
- Level measurements in SSTs (when not collected electronically).

Weekly inspections include recording equipment oil levels and verifying the operational status of pumps and other equipment.

5.1.3 Interim Stabilization

Interim Stabilization of the Single-Shell Tanks has been completed with the exception of 241-S-102 which is currently in retrieval mode.

5.2 BEST MANAGEMENT PRACTICE MONITORING

This section describes liquid level and liquid intrusion monitoring activities that supplement the LDM requirements specified in Section 4.0. These supplemental monitoring activities, or BMPs, are not derived from the regulations and are therefore included as recommended practices, not as requirements. This section only addresses SST system components that store liquids (i.e., SSTs, MUSTs, and vessels and cells in miscellaneous structures). Appendix A identifies the SST system components subject to BMP monitoring, and Appendix B provides a more extensive discussion of the implementation rationale for LDM and BMPs. No BMPs are applied to other SST system components.

5.2.1 Single-Shell Tanks

The SSTs are currently storing 2.89 million gallons of drainable liquid waste. Based on the logic presented in Section 4.0 (see), the 149 SSTs are grouped into four groups of tanks.

The first group of SSTs includes tanks that are technically feasible to LDM and do not meet the stabilization criteria. These tanks are leak detection monitored based on the requirements identified in Section 4.0. No supplemental BMPs are applied to this group of tanks. (Refer to Table B-3)

The second group of SSTs includes tanks that are technically feasible to LDM, meet interim stabilization criteria and have not had intrusion prevention activity completed or do not meet interim stabilization criteria, do not have suspect integrity, and have completed intrusion prevention. As a BMP, the tanks that meet interim stabilization criteria and do not have completed intrusion prevention are monitored at least weekly for liquid intrusions using currently

available monitoring systems. The tanks that do not meet interim stabilization critieria, have completed intrusion prevention, and do not have suspect integrity are monitored at least quarterly. Tanks in which intrusion is detected shall be monitored weekly. The cause of the intrusion will be determined and action taken to stop the intrusion. Liquid from intrusion will be removed during the waste retrieval of the effected tank. (Refer to Table B-4)

The third group of SSTs includes tanks that either: (a) Are technically feasible to LDM, meet the interim stabilization criteria, but have suspect integrity; or (b) have liquid volumes which are not technically feasible to detect and have suspect integrity. A tank is deemed to have suspect integrity if it has been previously declared a known or assumed leaker (HNF-EP-0182, Rev. 173) or was identified in RPP-10435, *Single-Shell Tank System Integrity Assessment Report* as having a bulge or having stored boiling waste. As a BMP, these tanks are monitored at least annually for liquid intrusions using currently available intrusion monitoring systems supplemented by visual photographic inspections on an as needed basis. The basis for annual monitoring is derived from documented past intrusion events and the fact that these tanks are known or suspected leakers or have integrity issues. Of the four known or potential intrusion events into SSTs previously interim stabilized, only one event has approached a rate of intrusion that exceeded 10,000 gallons over a 12-month period. Most of these tanks have less than 40,000 gallons drainable interstitial liquid waste and hence an intrusion event would be detected in a timely manner to facilitate a response action (i.e., either mitigating the cause of the intrusion or pumping drainable liquids). (Refer to Table B-5)

The fourth group of SSTs include those SSTs that either: (a) Are technically feasible to LDM, meet interim stabilization criteria, intrusion prevention has been completed, and do not have suspect integrity; or (b) Have liquid volumes which are not technically feasible to detect and do not have suspect integrity; or (c) have completed, as agreed to by Ecology and the Office of River Protection, waste retrieval. As a BMP, these tanks are periodically monitored (at least annually) for liquid intrusions using currently available intrusion monitoring system supplemented by scheduled visual photographic inspections. The basis for intrusion monitoring once per year is derived from documented past intrusion events and the fact that these tanks are sound tanks with no known integrity issues or have completed, as agreed to by Ecology and the Office of River Protection, waste retrieval. Of the four known or potential intrusion events into tanks previously interim stabilized, the average intrusion rate has been approximately 1,000 gallons per year. Most of these tanks have less than 40,000 gallons drainable interstitial liquid waste and hence an intrusion event would be detected in a timely manner to facilitate a response action (i.e., mitigating the cause of the intrusion, pumping drainable liquids, or enhanced monitoring). (Refer to Table B-6)

5.2.2 Miscellaneous Underground Storage Tanks

There are seventeen inactive/not-in-use MUSTs in the Single-Shell Tank System. These MUSTs are grouped into one of two categories and monitored accordingly.

5.2.3 Vessels and Cells in Miscellaneous Structures

Based on the logic presented in Section 4.0 (see Figure 4-4), the 17 vessels, which currently store approximately 21,534 gallons of known liquid waste are grouped into two groups of vessels.

The first group consists of mission essential vessels and cells, inactive/not-in-use vessels and cells that contain a known volume of liquid waste and do not meet the interim stabilization criteria (i.e., less than 400 gallons of liquids). This group includes eight vessels containing approximately 26,423 gallons of liquids (approximately 99.02% of the total known drainable liquids in vessels and cells in miscellaneous structures). These vessels are leak detection monitored based on the requirements identified in Section 4.0. No BMPs are applied to this group of vessels.

The second group consists of vessels and cells known to be dry, and inactive/not-in-use vessels and cells with known liquid volumes that meet interim stabilization criteria (i.e., less than 400 gallons of liquids). This group includes nine vessels and cells containing approximately 211 gallons of liquids (approximately 0.98% of the total known drainable liquids in vessels and cells in miscellaneous structures). Based on minimal liquid inventories, no LDM requirements or BMPs are applied to this group of vessels.

6.0 CHANGE CONTROL

This document is a HFFACO Primary Document requiring Ecology review and approval. Once approved, Section 4.0 of this document establishes the F&Rs for SST system LDM. Revisions to the approach described in Section 4.0 will follow the criteria outlined in Section 9.3, "Document Revisions," of the HFFACO. Modifications to Section 4.0 will be assessed using existing criteria. Minor field changes to Section 4.0 (as discussed in Section 12.4 of the HFFACO) can be made by the person in charge of the particular activity (i.e., the CH2M HILL Project Manager or equivalent). Minor field changes are those that have no adverse effect on the technical adequacy of the job or work schedule (i.e., does not impact completion of milestone commitments). Such field changes will be documented in daily logbooks (or equivalent) that are maintained by the project. Revisions/changes to Section 4.0 not considered minor field changes can be made through use of a change notice in accordance with Section 9.3, "Document Revisions," and Section 12.0, "Changes to the Agreement." Major changes to Section 4.0 (those requiring a change notice) or revisions to the plan are further defined by the following criteria:

- Significant change affecting public health or the environment;
- Evaluation of remedial alternatives (i.e., major changes to retrieval technologies and/or programmatic decisions that impact the technical adequacy of the project or impact work schedules); and
- Protection of human health or the environment (i.e., exceeding maximum leak loss limits or major design change to LDM criteria).

This document establishes the LDM baseline and conditions for the SST system. Upon approval of this LDM F&R Document as a Primary Document, the contractor will maintain and update, as necessary, tank farm procedures and internal documents to implement the LDM F&Rs in this document based on existing and changing conditions in the SST system.

The contractor's internal documents will not be subject to the change control process specified in this section. Changes to the contractor's document will be maintained and controlled in accordance with tank farm document control procedures.

This page intentionally left blank.

7.0 REFERENCES

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities," *Code of Federal Regulations*, as amended.

Atomic Energy Act of 1954, as amended, 42 U.S.C. Sect. 2011 - Sect. 2259.

CHG-0007065-R2, 2001, *Evaluation of 120 SSTs That Have Been Interim Stabilized*, CH2M HILL Hanford Group, Inc., Richland, Washington.

CT-99-5076-EFS, Consent Decree Between the State of Washington, Department of Ecology (Plaintiff), and United States Department of Energy (Defendant), August 16, 1999.

Comprehensive Environmental Response, Compensation , and Liability Act of 1980, 42 USC 9601 et seq.

DOE/RL-89-16, *Single-Shell Tank Closure Work Plan*, Rev. 1, May 1996, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1996, Close Out Form, "Environmental Compliance Issues Identified in DOE/RL Letter 95-PCA-342 Dated July 6, 1995," Tracking Numbers 5.3 and 5.4, August 7, 1996, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

HNF-4872, Vol. I, Rev. 0, *Single-Shell Tank Leak History Compilation Volume I of II: Summary*, Lockheed Martin Hanford Corporation, Richland, Washington.

HNF-EP-0182, Rev. 161, *Waste Tank Summary Report for Month Ending August 31, 2001*, CH2M HILL Hanford Group, Inc., Richland, Washington.

HNF-EP-0182, Rev. 166, *Waste Tank Summary Report for Month Ending January 1, 2002*, CH2M HILL Hanford Group, Inc., Richland, Washington.

HNF-EP-0182, Rev. 173, *Waste Tank Summary Report for Month Ending August 31, 2002*, CH2M HILL Hanford Group, Inc., Richland, Washington.

HNF-IP-0842, Vol. 4, Section 4.1, Rev. 3c, *Tank Farm Facility Interim Stabilization Evaluation*, CH2M HILL Hanford Group, Inc., Richland, Washington.

HNF-SD-RE-TI-178, Rev. 7, *Single-Shell Tank Leak Stabilization Record,* CH2M HILL Hanford Group, Inc., Richland, Washington.

Moore, S.V., February 2, 2001, Letter to Dr. Harry Boston, U.S. Department of Energy-Office of River Protection, and M. P. (Fran) Delozier, CH2M HILL Hanford Group, Inc., *Dangerous Waste Compliance Inspection of the Single Shell Tank System.*

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

RPP-9645, Rev. 0, *Single-Shell Tank System Surveillance and Monitoring Program*, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-10435, Rev. 0, *Single-Shell Tank System Integrity Assessment Report*, CH2M HILL Hanford Group, Inc., Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

APPENDIX A

LIST OF SINGLE-SHELL TANK SYSTEM COMPONENTS RELATING TO LEAK DETECTION AND MONITORING

This page intentionally left blank.

APPENDIX A

LIST OF SINGLE-SHELL TANK SYSTEM COMPONENTS RELATING TO LEAK DETECTION AND MONITORING

Appendix A provides a list of all individual components in the single-shell tank system related to leak detection and monitoring. The list includes the following features:

- Unique component numbers;
- Descriptions of individual component groupings that mirror the groupings in main text Section 3.0, "Single-Shell Tank System Component Descriptions and Leak Detection Status;"
- Component status (mission essential or inactive/not-in-use); and
- Leak detection and monitoring requirements and best management practices.

Mission Essential Components

Single-Shell Tanks		
Facility Number	**Description**	**LDM or BMP**
241-A-101	100-Series SST	BMP Periodic Monitoring
241-A-102	100-Series SST	BMP Periodic Monitoring
241-A-103	100-Series SST	LDM
241-A-104	100-Series SST	BMP Periodic Monitoring
241-A-105	100-Series SST	BMP Periodic Monitoring
241-A-106	100-Series SST	BMP Periodic Monitoring
241-AX-101	100-Series SST	BMP Periodic Monitoring
241-AX-102	100-Series SST	BMP Periodic Monitoring
241-AX-103	100-Series SST	BMP Periodic Monitoring
241-AX-104	100-Series SST	BMP Periodic Monitoring
241-B-101	100-Series SST	BMP Periodic Monitoring
241-B-102	100-Series SST	BMP Intrusion Monitoring
241-B-103	100-Series SST	BMP Periodic Monitoring
241-B-104	100-Series SST	BMP Intrusion Monitoring
241-B-105	100-Series SST	BMP Periodic Monitoring
241-B-106	100-Series SST	BMP Intrusion Monitoring
241-B-107	100-Series SST	BMP Periodic Monitoring
241-B-108	100-Series SST	BMP Intrusion Monitoring
241-B-109	100-Series SST	BMP Intrusion Monitoring
241-B-110	100-Series SST	BMP Periodic Monitoring
241-B-111	100-Series SST	BMP Periodic Monitoring
241-B-112	100-Series SST	BMP Periodic Monitoring
241-B-201	200-Series SST	BMP Periodic Monitoring
241-B-202	200-Series SST	BMP Intrusion Monitoring
241-B-203	200-Series SST	BMP Periodic Monitoring
241-B-204	200-Series SST	BMP Periodic Monitoring
241-BX-101	100-Series SST	BMP Periodic Monitoring
241-BX-102	100-Series SST	BMP Periodic Monitoring
241-BX-103	100-Series SST	LDM
241-BX-104	100-Series SST	BMP Intrusion Monitoring
241-BX-105	100-Series SST	BMP Periodic Monitoring
241-BX-106	100-Series SST	BMP Intrusion Monitoring
241-BX-107	100-Series SST	BMP Intrusion Monitoring
241-BX-108	100-Series SST	BMP Periodic Monitoring
241-BX-109	100-Series SST	BMP Intrusion Monitoring
241-BX-110	100-Series SST	BMP Periodic Monitoring
241-BX-111	100-Series SST	BMP Periodic Monitoring
241-BX-112	100-Series SST	BMP Intrusion Monitoring
241-BY-101	100-Series SST	BMP Intrusion Monitoring
241-BY-102	100-Series SST	BMP Periodic Monitoring
241-BY-103	100-Series SST	LDM
241-BY-104	100-Series SST	BMP Periodic Monitoring
241-BY-105	100-Series SST	BMP Periodic Monitoring
241-BY-106	100-Series SST	BMP Periodic Monitoring
241-BY-107	100-Series SST	BMP Periodic Monitoring
241-BY-108	100-Series SST	BMP Periodic Monitoring
241-BY-109	100-Series SST	BMP Periodic Monitoring
241-BY-110	100-Series SST	BMP Intrusion Monitoring
241-BY-111	100-Series SST	BMP Intrusion Monitoring

Mission Essential Components

Single-Shell Tanks		
Facility Number	**Description**	**LDM or BMP**
241-BY-112	100-Series SST	BMP Intrusion Monitoring
241-C-101	100-Series SST	BMP Periodic Monitoring
241-C-102	100-Series SST	BMP Periodic Monitoring
241-C-103	100-Series SST	BMP Periodic Monitoring
241-C-104	100-Series SST	BMP Intrusion Monitoring
241-C-105	100-Series SST	BMP Intrusion Monitoring
241-C-106	100-Series SST	BMP Periodic Monitoring
241-C-107	100-Series SST	BMP Periodic Monitoring
241-C-108	100-Series SST	BMP Intrusion Monitoring
241-C-109	100-Series SST	BMP Intrusion Monitoring
241-C-110	100-Series SST	BMP Periodic Monitoring
241-C-111	100-Series SST	BMP Periodic Monitoring
241-C-112	100-Series SST	BMP Intrusion Monitoring
241-C-201	200-Series SST	BMP Periodic Monitoring
241-C-202	200-Series SST	BMP Periodic Monitoring
241-C-203	200-Series SST	BMP Periodic Monitoring
241-C-204	200-Series SST	BMP Periodic Monitoring
241-S-101	100-Series SST	BMP Periodic Monitoring
241-S-102	100-Series SST	BMP Periodic Monitoring
241-S-103	100-Series SST	BMP Periodic Monitoring
241-S-104	100-Series SST	BMP Periodic Monitoring
241-S-105	100-Series SST	BMP Intrusion Monitoring
241-S-106	100-Series SST	BMP Periodic Monitoring
241-S-107	100-Series SST	BMP Periodic Monitoring
241-S-108	100-Series SST	BMP Intrusion Monitoring
241-S-109	100-Series SST	BMP Periodic Monitoring
241-S-110	100-Series SST	BMP Intrusion Monitoring
241-S-111	100-Series SST	BMP Periodic Monitoring
241-S-112	100-Series SST	BMP Periodic Monitoring
241-SX-101	100-Series SST	BMP Periodic Monitoring
241-SX-102	100-Series SST	BMP Periodic Monitoring
241-SX-103	100-Series SST	BMP Periodic Monitoring
241-SX-104	100-Series SST	BMP Periodic Monitoring
241-SX-105	100-Series SST	BMP Periodic Monitoring
241-SX-106	100-Series SST	BMP Periodic Monitoring
241-SX-107	100-Series SST	BMP Periodic Monitoring
241-SX-108	100-Series SST	BMP Periodic Monitoring
241-SX-109	100-Series SST	BMP Periodic Monitoring
241-SX-110	100-Series SST	BMP Periodic Monitoring
241-SX-111	100-Series SST	BMP Periodic Monitoring
241-SX-112	100-Series SST	BMP Periodic Monitoring
241-SX-113	100-Series SST	BMP Periodic Monitoring
241-SX-114	100-Series SST	BMP Periodic Monitoring
241-SX-115	100-Series SST	BMP Periodic Monitoring
241-T-101	100-Series SST	BMP Periodic Monitoring
241-T-102	100-Series SST	LDM
241-T-103	100-Series SST	BMP Periodic Monitoring
241-T-104	100-Series SST	BMP Intrusion Monitoring
241-T-105	100-Series SST	BMP Intrusion Monitoring

Mission Essential Components

Single-Shell Tanks		
Facility Number	**Description**	**LDM or BMP**
241-T-106	100-Series SST	BMP Periodic Monitoring
241-T-107	100-Series SST	BMP Periodic Monitoring
241-T-108	100-Series SST	BMP Periodic Monitoring
241-T-109	100-Series SST	BMP Periodic Monitoring
241-T-110	100-Series SST	BMP Periodic Monitoring
241-T-111	100-Series SST	BMP Periodic Monitoring
241-T-112	100-Series SST	LDM
241-T-201	200-Series SST	BMP Periodic Monitoring
241-T-202	200-Series SST	BMP Intrusion Monitoring
241-T-203	200-Series SST	BMP Intrusion Monitoring
241-T-204	200-Series SST	BMP Intrusion Monitoring
241-TX-101	100-Series SST	BMP Intrusion Monitoring
241-TX-102	100-Series SST	BMP Periodic Monitoring
241-TX-103	100-Series SST	BMP Intrusion Monitoring
241-TX-104	100-Series SST	BMP Intrusion Monitoring
241-TX-105	100-Series SST	BMP Periodic Monitoring
241-TX-106	100-Series SST	BMP Periodic Monitoring
241-TX-107	100-Series SST	BMP Periodic Monitoring
241-TX-108	100-Series SST	BMP Intrusion Monitoring
241-TX-109	100-Series SST	BMP Intrusion Monitoring
241-TX-110	100-Series SST	BMP Periodic Monitoring
241-TX-111	100-Series SST	BMP Intrusion Monitoring
241-TX-112	100-Series SST	BMP Intrusion Monitoring
241-TX-113	100-Series SST	BMP Periodic Monitoring
241-TX-114	100-Series SST	BMP Periodic Monitoring
241-TX-115	100-Series SST	BMP Periodic Monitoring
241-TX-116	100-Series SST	BMP Periodic Monitoring
241-TX-117	100-Series SST	BMP Periodic Monitoring
241-TX-118	100-Series SST	BMP Intrusion Monitoring
241-TY-101	100-Series SST	BMP Periodic Monitoring
241-TY-102	100-Series SST	BMP Intrusion Monitoring
241-TY-103	100-Series SST	BMP Periodic Monitoring
241-TY-104	100-Series SST	BMP Periodic Monitoring
241-TY-105	100-Series SST	BMP Periodic Monitoring
241-TY-106	100-Series SST	BMP Periodic Monitoring
241-U-101	100-Series SST	BMP Periodic Monitoring
241-U-102	100-Series SST	BMP Periodic Monitoring
241-U-103	100-Series SST	BMP Intrusion Monitoring
241-U-104	100-Series SST	BMP Periodic Monitoring
241-U-105	100-Series SST	BMP Periodic Monitoring
241-U-106	100-Series SST	BMP Periodic Monitoring
241-U-107	100-Series SST	BMP Periodic Monitoring
241-U-108	100-Series SST	BMP Periodic Monitoring
241-U-109	100-Series SST	BMP Periodic Monitoring
241-U-110	100-Series SST	BMP Periodic Monitoring
241-U-111	100-Series SST	BMP Periodic Monitoring
241-U-112	100-Series SST	BMP Periodic Monitoring
241-U-201	200-Series SST	BMP Intrusion Monitoring
241-U-202	200-Series SST	BMP Intrusion Monitoring

Mission Essential Components

Single-Shell Tanks		
Facility Number	**Description**	**LDM or BMP**
241-U-203	200-Series SST	BMP Intrusion Monitoring
241-U-204	200-Series SST	BMP Intrusion Monitoring

Vaults (None)

Between-tank Pits - Diversion Boxes		
Facility Number	**Description**	**LDM or BMP**
None	Diversion Box	LDM (When In Use)

Between-tank Pits - Valve Pits		
Facility Number	**Description**	**LDM or BMP**
241-S-A	Valve Pit	LDM (When In Use)

Between-tank Pits - Flush Pits (None)

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-S-02B	Distributor Pit	LDM (When In Use)
None		

Miscellaneous Structures (None)

Piping Transfer Lines (None)			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**

Inactive/Not-In-Use Components[1]

Single-Shell Tanks (None)

Vessels and Cells in Miscellaneous Structures		
Facility Number	**Description**	**LDM OR BMP**
244-AR Vault	Vault contains four tanks (244-AR-001 thru -004)	BMP (Cell 3, TK-001, TK-002, TK-003)(Cell 1, Cell 2, TK-004)
244-CR Vault	Vault contains four tanks (244-CR-001 thru -003 plus 244-CR-011)	LDM (Cell 1, Cell 2, Cell 3, CR-003) (CR-001, CR-002, CR-011) None (Cell 11)
241-AX-IX	Ion-exchange unit	BMP
241-BY-ITS1	In-tank unit solidification	BMP

Miscellaneous Underground Storage Tanks		
Facility Number	**Description**	**LDM or BMP**
241-TX-302C	Catch Tank	BMP
241-ER-311	Catch Tank	BMP
241-BY-ITS2-Tank 2	Catch Tank	BMP
241-UX-302A	Catch Tank	BMP
241-AX-152	Catch Tank	BMP
241-S-304	Catch Tank	BMP
241-A-417	Catch Tank	BMP
241-AX-151-CT	Catch Tank	BMP
244-U	DCRT	BMP
244-A	DCRT	LDM
244-S	DCRT	LDM
244-BX	DCRT	LDM
244-TX	DCRT	LDM
241-A-350	Catch Tank	LDM
241-EW-151	Catch Tank	LDM
241-U-301B	Catch Tank	LDM
241-A-302A	Catch Tank	LDM

[1]If an inactive/not-in-use component changes status and becomes mission essential, then the requirements for mission essential components in Section 4.0 of this document apply to that component.

Inactive/Not-In-Use Components

Between-tank Pits – Diversion Boxes		
Facility Number	**Description**	**LDM or BMP**
240-S-151	Diversion Box	None
240-S-152	Diversion Box	None
241-AR-151	Biversion Box	None
241-A-152	Diversion Box	None
241-A-153	Diversion Box	None
241-AX-153	Diversion Box	None
241-AX-155	Diversion Box	None
241-B-151	Diversion Box	None
241-B-152	Diversion Box	None
241-B-153	Diversion Box	None
241-B-154	Diversion Box	None
241-B-252	Diversion Box	None
241-BR-152	Diversion Box	None
241-BX-153	Diversion Box	None
241-BX-154	Diversion Box	None
241-BX-155	Diversion Box	None
241-BXR-151	Diversion Box	None
241-BXR-152	Diversion Box	None
241-BXR-153	Diversion Box	None
241-BYR-152	Diversion Box	None
241-BYR-153	Diversion Box	None
241-BYR-154	Diversion Box	None
241-C-151	Diversion Box	None
241-C-152	Diversion Box	None
241-C-153	Diversion Box	None
241-C-154	Diversion Box	None
241-C-252	Diversion Box	None
241-CR-151	Diversion Box	None
241-CR-152	Diversion Box	None
241-CR-153	Diversion Box	None
241-S-152	Diversion Box	None
241-SX-151	Diversion Box	None
241-SX-152	Diversion Box	None
241-T-151	Diversion Box	None
241-T-152	Diversion Box	None
241-T-153	Diversion Box	None
241-T-252	Diversion Box	None
241-TR-152	Diversion Box	None
241-TR-153	Diversion Box	None
241-TX-153	Diversion Box	None
241-TX-155	Diversion Box	None
241-TXR-151	Diversion Box	None
241-TXR-152	Diversion Box	None
241-TXR-153	Diversion Box	None
241-TXR-244	Diversion Box	None
241-TY-153	Diversion Box	None
241-U-153	Diversion Box	None
241-U-252	Diversion Box	None
241-UR-151	Diversion Box	None
241-UR-152	Diversion Box	None

Inactive/Not-In-Use Components

Between-tank Pits – Diversion Boxes		
Facility Number	**Description**	**LDM or BMP**
241-UR-153	Diversion Box	None
241-UR-154	Diversion Box	None
241-UR-244	Diversion Box	None
242-B-151	Diversion Box	None
242-T-151	Diversion Box	None

Between-tank Pits – Valve Pits		
Facility Number	**Description**	**LDM or BMP**
241-BY-109	Valve Pit	None
241-C	Valve Pit	None
209-E-WS-3	209-E-WS-3 Critical mass laboratory Valve Pit	None
241-AX-A	Valve Pit	None
241-S-B	Valve Pit	None
241-S-C	Valve Pit	None
241-S-D	Valve Pit	None
241-SX-A	Valve Pit	None
241-SX-B	Valve Pit	None
241-U-A	Valve Pit	None
241-U-B	Valve Pit	None
241-U-C	Valve Pit	None
241-U-D	Valve Pit	None

Between-tank Pits – Flush Pits (None)

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-A-01A	Pump Pit	None
241-A-01B	Pump Pit	None
241-A-01C	Sluice Pit	None
241-A-01H	Distributor Pit	None
241-A-02A	Pump Pit	None
241-A-02B	Pump Pit	None
241-A-02C	Receiving Pit	None
241-A-02D	Distribution Pit	None
241-A-03A	Pump Pit	None
241-A-03B	Pump Pit	None
241-A-03C	Pump Pit	None
241-A-03D	Distribution Pit	None
241-A-04A	Pump Pit	None
241-A-04B	Sluice Pit	None
241-A-04C	Sluice Pit	None
241-A-05A	Pump Pit	None
241-A-05B	Sluice Pit	None
241-A-05C	Pump Pit	None
241-A-05D	Sluice Pit	None
241-A-06A	Pump Pit	None
241-A-06B	Sluice Pit	None
241-A-06C	Pump Pit	None
241-A-06D	Distribution Pit	None

Inactive/Not-In-Use Components

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-AX-01A	Pump Pit	None
241-AX-01B	Pump Pit	None
241-AX-01C	Sluice Pit	None
241-AX-01D	Sluice Pit	None
241-AX-02A	Distribution Pit	None
241-AX-02B	Pump Pit	None
241-AX-02C	Sluice Pit	None
241-AX-02D	Pump Pit	None
241-AX-03A	Distribution Pit	None
241-AX-03B	Pump Pit	None
241-AX-03C	Sluice Pit	None
241-AX-03D	Pump Pit	None
241-AX-04A	Distribution Pit	None
241-AX-04B	Pump Pit	None
241-AX-04C	Sluice Pit	None
241-AX-04D	Sluice Pit	None
241-B-01A	Pump Pit	None
241-B-01B	Heel Pit	None
241-B-01C	Sluice Pit	None
241-B-02A	Pump Pit	None
241-B-02B	Heel Pit	None
241-B-02C	Sluice Pit	None
241-B-03A	Pump Pit	None
241-B-03B	Heel Pit	None
241-B-03C	Sluice Pit	None
241-B-06A	Pump Pit	None
241-B-08A	Pump Pit	None
241-B-09A	Pump Pit	None
241-B-12A	Pump Pit	None
241-B-104	No pit, covered saltwell caisson	None
241-B-105	No pit, covered saltwell caisson	None
241-B-107	No pit, covered saltwell caisson	None
241-B-108	Covered Saltwell caisson	None
241-B-109	Covered saltwell caisson	None
241-B-110	No pit, covered saltwell caisson	None
241-B-111	No pit, covered saltwell caisson	None
241-BX-01A	Pump Pit	None
241-BX-01B	Heel Pit	None
241-BX-01C	Sluice Pit	None
241-BX-02A	Pump Pit	None
241-BX-02B	Heel Pit	None
241-BX-02C	Sluice Pit	None
241-BX-03A	Pump Pit	None
241-BX-03B	Heel Pit	None
241-BX-03C	Sluice Pit	None
241-BX-04A	Pump Pit	None
241-BX-04B	Heel Pit	None
241-BX-04C	Sluice Pit	None
241-BX-05A	Pump Pit	None

Inactive/Not-In-Use Components

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-BX-05B	Heel Pit	None
241-BX-05C	Sluice Pit	None
241-BX-06A	Pump Pit	None
241-BX-06B	Heel Pit	None
241-BX-06C	Sluice Pit	None
241-BX-08A	Pump Pit	None
241-BX-10A	Pump Pit	None
241-BX-11A	Pump Pit	None
241-BX-12A	Pump Pit	None
241-BX-107	No pit, covered saltwell caisson	None
241-BX-109	No pit, covered saltwell caisson	None
241-BX-110	Covered saltwell caisson	None
241-BX-111	Covered saltwell caisson	None
241-BX-112	Covered saltwell caisson	None
241-BY-01A	Pump Pit	None
241-BY-01C	Sluice Pit	None
241-BY-01D	Sluice Pit	None
241-BY-02A	Pump Pit	None
241-BY-02C	Sluice Pit	None
241-BY-02D	Sluice Pit	None
241-BY-03A	Pump Pit	None
241-BY-03C	Sluice Pit	None
241-BY-03D	Sluice Pit	None
241-BY-04A	Pump Pit	None
241-BY-04C	Sluice Pit	None
241-BY-04D	Sluice Pit	None
241-BY-05A	Pump Pit	None
241-BY-05C	Sluice Pit	None
241-BY-05D	Sluice Pit	None
241-BY-06A	Pump Pit	None
241-BY-06C	Sluice Pit	None
241-BY-06D	Sluice Pit	None
241-BY-07A	Pump Pit	None
241-BY-08A	Pump Pit	None
241-BY-09A	Pump Pit	None
241-BY-10A	Pump Pit	None
241-BY-11A	Pump Pit	None
241-BY-11C	Sluice Pit	None
241-BY-11D	Sluice Pit	None
241-BY-12A	Pump Pit	None
241-BY-12C	Sluice Pit	None
241-BY-12D	Sluice Pit	None
241-C-107	No pit, covered saltwell caisson	None
241-C-108	No pit, covered saltwell caisson	None
241-C-109	No pit, covered saltwell caisson	None
241-C-110	No pit, covered saltwell caisson	None
241-C-111	No pit, covered saltwell caisson	None
241-C-112	No pit, covered saltwell caisson	None
241-C-01A	Pump Pit	None

Inactive/Not-In-Use Components

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-C-01B	Heel Pit	None
241-C-01C	Sluice Pit	None
241-C-02A	Pump Pit	None
241-C-02B	Heel Pit	None
241-C-02C	Sluice Pit	None
241-C-03A	Pump Pit	None
241-C-03B	Heel Pit	None
241-C-03C	Sluice Pit	None
241-C-04A	Pump Pit	None
241-C-04B	Heel Pit	None
241-C-04C	Sluice Pit	None
241-C-104	Salt Well Caisson	None
241-C-05A	Pump Pit	None
241-C-05B	Heel Pit	None
241-C-05C	Sluice Pit	None
241-C-06A	Pump Pit	None
241-C-06B	Heel Pit	None
241-C-06C	Sluice Pit	None
241-S-01A	Pump Pit	None
241-S-02A	Pump Pit	None
241-S-03A	Pump Pit	None
241-S-104	Covered saltwell caisson	None
241-S-05A	Pump Pit	None
241-S-06A	Pump Pit	None
241-S-07A	Pump Pit	None
241-S-08A	Pump Pit	None
241-S-09A	Pump Pit	None
241-S-10A	Pump Pit	None
241-S-11A	Pump Pit	None
241-S-12A	Pump Pit	None
241-SX-01A	Pump Pit	None
241-SX-02A	Pump Pit	None
241-SX-02B	Pump Pit	None
241-SX-03A	Pump Pit	None
241-SX-03B	Pump Pit	None
241-SX-04A	Pump Pit	None
241-SX-401	Valve and Sampler Pit	None
241-SX-05A	Pump Pit	None
241-SX-05B	Heel Pit	None
241-SX-06A	Pump Pit	None
241-SX-106	Condenser pump pit	None
241-SX-07A	Pump Pit	None
241-SX-07B	Pit	None
241-SX-08A	Pump Pit	None
241-SX-09A	Pump Pit	None
241-SX-10A	Pump Pit	None
241-SX-11A	Pump Pit	None
241-SX-12A	Pump Pit	None
241-SX-112	Condensate valve pit	None

Inactive/Not-In-Use Components

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-SX-13A	Pump Pit	None
241-SX-14A	Pump Pit	None
241-SX-15A	Pump Pit	None
241-T-01A	Pump Pit	None
241-T-01B	Heel Pit	None
241-T-01C	Sluice Pit	None
241-T-02A	Pump Pit	None
241-T-02B	Heel Pit	None
241-T-02C	Sluice Pit	None
241-T-03A	Pump Pit	None
241-T-03B	Heel Pit	None
241-T-03C	Sluice Pit	None
241-T-104	No pit, covered saltwell caisson	None
241-T-105	No pit, covered saltwell caisson	None
241-T-107	No Pit, covered saltwell caisson	None
241-T-109	No Pit, covered saltwell caisson	None
241-T-110	Covered saltwell caisson	None
241-T-111	No pit, covered saltwell caisson	None
241-T-201	No Pit, covered saltwell caisson	None
241-T-202	No Pit, covered saltwell caisson	None
241-T-203	No Pit, covered saltwell caisson	None
241-T-204	No Pit, covered saltwell caisson	None
241-TX-01A	Pump Pit	None
241-TX-01C	Sluice Pit	None
241-TX-01D	Sluice Pit	None
241-TX-02A	Pump Pit	None
241-TX-02C	Sluice Pit	None
241-TX-02D	Sluice Pit	None
241-TX-03A	Pump Pit	None
241-TX-03C	Sluice Pit	None
241-TX-03D	Sluice Pit	None
241-TX-04A	Pump Pit	None
241-TX-04C	Sluice Pit	None
241-TX-04D	Sluice Pit	None
241-TX-05A	Pump Pit	None
241-TX-05C	Sluice Pit	None
241-TX-05D	Sluice Pit	None
241-TX-06A	Pump Pit	None
241-TX-06C	Sluice Pit	None
241-TX-06D	Sluice Pit	None
241-TX-07A	Pump Pit	None
241-TX-07C	Sluice Pit	None
241-TX-07D	Sluice Pit	None
241-TX-08A	Pump Pit	None
241-TX-08C	Sluice Pit	None
241-TX-08D	Sluice Pit	None
241-TX-09A	Pump Pit	None
241-TX-10A	Pump Pit	None
241-TX-11A	Pump Pit	None

Inactive/Not-In-Use Components

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-TX-12A	Pump Pit	None
241-TX-112B	Slurry pump pit	None
241-TX-112C	Heat exchanger pit	None
241-TX-13A	Pump Pit	None
241-TX-14A	Pump Pit	None
241-TX-15A	Sluice Pit	None
241-TX-15B	Pump Pit	None
241-TX-116	Covered saltwell caisson	None
241-TX-17A	Pump Pit	None
241-TX-18A	Pump Pit	None
241-TY-01A	Pump Pit	None
241-TY-101	Sluice pit	None
241-TY-101B	Sluice pit	None
241-TY-102A	Sluice pit	None
241-TY-102B	Sluice pit	None
241-TY-02A	Pump Pit	None
241-TY-03A	Pump Pit	None
241-TY-103	Covered saltwell caisson	
241-TY-04A	Pump Pit	None
241-TY-105	No pit, covered saltwell caisson	None
241-TY-06	No pit, covered saltwell caisson	None
241-U-01A	Pump Pit	None
241-U-01B	Heel Pit	None
241-U-01C	Sluice Pit	None
241-U-02A	Pump Pit	None
241-U-02B	Distributor Pit	None
241-U-02C	Sluice pit	None
241-U-03A	Pump Pit	None
241-U-03B	Heel Pit	None
241-U-03C	Sluice Pit	None
241-U-04A	Pump Pit	None
241-U-04B	Heel Pit	None
241-U-04C	Sluice Pit	None
241-U-05A	Pump Pit	None
241-U-05B	Heel Pit	None
241-U-05C	Sluice Pit	None
241-U-06A	Pump Pit	None
241-U-06B	Heel Pit	None
241-U-06C	Sluice Pit	None
241-U-07A	Pump Pit	None
241-U-07B	Distributor Pit	None
241-U-07C	Sluice Pit	None
241-U-08A	Pump Pit	None
241-U-08B	Distributor Pit	None
241-U-08C	Sluice Pit	None
241-U-09A	Pump Pit	None
241-U-09B	Distributor Pit	None
241-U-09C	Sluice Pit	None
241-U-110	Condenser pit	None

Inactive/Not-In-Use Components

At-Tank Pits		
Facility Number	**Description**	**LDM or BMP**
241-U-10A	Pump Pit	None
241-U-10B	Distributor Pit	None
241-U-11A	Pump Pit	None
241-U-11B	Distributor Pit	None
241-U-112	No pit, covered saltwell caisson	None

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
103	241-SX-103-03-A	Capped	None
105	241-SX-105	241-SX-152	None
107	241-SX-107-07A-1	241-SX-152	None
108	241-SX-108-08A-1	241-SX-152	None
109	241-SX-109-09A-1	241-SX-152	None
110	241-SX-110-10A-1	241-SX-152	None
111	241-SX-111-11A-1	241-SX-152	None
112	241-SX-112-12A-1	241-SX-152	None
113	241-SX-113-13A-1	241-SX-152	None
114	241-SX-114-14A-1	241-SX-152	None
115	241-SX-115-15A-1	241-SX-152	None
234	241-S-102-02A-A	Unknown	None
235	241-S-102-02A-AA	Unknown	None
312	241-SX-102	Clean Out Boxes-15 Thru 22	None
318	241-SX-102	241-SX-A, SX-B Flush Pit	None
456	241-SX-152	Capped	None
540	241-S-107-07A	241-S-151-L18	None
703	241-TX-109-09A-A	241-T-151-U3	None
704	SN-249	241-TX-109-09A-D	None
704	SN-249	241-TY-103-A	None
704	SN-249	241-TY-102	None
704	SN-249	241-TY-105	None
706	241-TX-105-05A-C	704	None
707	241-TX-06A-A	241-TX-02A-C	None
708	241-TX-102-02A-D	241-TX-103-03A-A	None
709	241-TX-103-03A-C	241-TX-104-04A-A	None
710	241-TX-108-08A-A	241-TX-104-04A-C	None
711	241-TX-107-07A-A	241-TX-108-08A-C	None
714	241-TX-110-10A-C	241-TX-111-11A-A	None
715	241-TX-111-11A-C	241-TX-112-12A-A	None
717	241-TX-118	241-TX-112-012A-C/15B Valve Pit	None
718	241-TX-113-13A	241-TX-115	None
720	241-TX-114	241-15B Valve Pit	None
721	241-TX-114-14A	241-TX-115	None
723	241-TX-118-18A	242-T	None
724	241-TX-111	241-TX-14B Valve Pit	None
724	241-TX-118	242-T	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
724	241-TY-101-01A-A	241-TY-103-03A-A	None
726	241-TY-01A-C	241-TY-102-02A-A	None
727	241-TY-102-02A-C	241-TY-104-04A-C	None
728	241-TX-118	241-TY-104-04A-C	None
730	241-TX-110	241-TX-14B Valve Pit	None
731	241-TX-117-17A	241-TX-118	None
750	241-TX-118-18A	241-TX-TX-115-15A-U2	None
800	241-BY-112-012D-U6	241-BY-111-011D-U6	None
801	241-BY-112-012D-U7	241-BY-111-011D-U7	None
801	244-AR-T-6	241-A-153-A	None
804	241-BY-110-010-A	241-BY-111-A	None
805	241-BY-107-07A-A	241-BY-110-010A-C	None
805	244-AR-T-13	241-A-153-B	None
806	241-BY-102-02A-U8	241-BY-111-011D-U4	None
806	241-BY-104-04D-A	241-BY-107-07A-D	None
807	241-BY-105-05D-A	241-BY-104-04D-C	None
808	241-BY-102	241-BY-105-05D-D	None
809	241-BY-103-03C-A	241-BY-105-05D-C	None
810	241-BY-103-03C-C	241-BY-106-06D-A	None
813	241-BY-108-08A-A	241-BY-107-07A-C	None
814	241-BY-102-02B	241-BY-111-011D-U8	None
814/4002/4028/G026/4001/T031	244-AR Vault-TK-001	PUREX	None
815	241-BY-110-010A-D	241-BX-112-012-A-A	None
816	241-BX-112-012A-C	241-BX-111-011A-A	None
817	241-BX-111-011A-C	241-BX-110-010A-A	None
819	244-AR-Tank-001-T5	244-AR-Tank-003-T14	None
820	241-BX-106-06A-C	241-BX-105-05A-A	None
820	Encasement Drain for V-383, V-384, V-385 from 241-TX-154	241-TX-152-U5	None
821	241-BY-101-01C-A	241-BX-105-05A-C	None
822	241-BX-105-05A	241-B-109-09A-C	None
822	241-BY-101-01C-C	241-BY-104-04D	None
823	241-BX-105-05A-E	241-B-112-012A-A	None
824	241-B-112-012A-C	241-B-108-08A-A	None
826	241-B-109-09A-D	241-B-108-08A-D	None
827	241-B-103-03A-UA	241-B-102-02A-U4	None
829	241-B-106-06A-C	241-B-109-09A-A	None
837	244-AR-Tank-001-2,-3,-4	244-AR-Tank001,002, 003,004	None
1006	205-S	240-S-152-U2	None
1045	240-S-152-U1	204-S	None
1115	240-S-151-U6	202-S	None
1140	240-S-151-U15	202-S	None
1145	240-S-151-U9	202-S	None
1238	202-S	240-S-151-U10	None
1540	240-S-151-U14	202-S	None
1541	240-S-151-U5	202-S	None
3130	240-S-151-U1	202-S	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
3591	240-S-151-U18	202-S	None
3592	240-S-151-U19	202-S	None
3603	240-S-151-U7	Capped	None
3610	240-S-151-U16	202-S	None
3635	240-S-151-U11	202-S	None
3658	240-S-151-U4	202-S	None
3666	240-S-151-U2	202-S	None
4001/T029	PUREX	241-A-B-R12	None
4002	241-AX-151	None Identified	None
4002/T031/G026/402A	PUREX	244-AR	None
4003	241-AX-151	None Identified	None
4003/T037/4017	PUREX	241-AX-152	None
4004	241-AX-151	Capped	None
4004/G341/V029	PUREX	241-A-A-L12	None
4006	241-AX-151	Capped	None
4007	244-AR Vault-T8A	241-AX-151	None
4009	241-AX-151	None Identified	None
4010	241-AX-151-Catch Tank	241-AX-151-F-Cell	None
4011	241-AX-151-Catch Tank	241-AX-151-E-Cell	None
4012	241-CR-153	241-AX-151 D-Cell	None
4013	241-AX-151-D-Cell	241-CR-152-U3A	None
4014	241-AX-151	Capped	None
4016	241-AX-151-Catch Tank Pit	241-AX-151-E-Cell	None
4017	241-AX-151-Washdown	Capped	None
4018	241-AX-151-Washdown	Capped	None
4019	241-AX-151	Capped	None
4020	241-AX-151	Capped	None
4021	241-AY-151-Nozzle 3	241-AX-152-L2	None
4021	241-AY-151	Jumper Box 153-AX	None
4022	241-AX-151-D-CELL	241-AX-152 Pump Pit	None
4024	241-AX-152-B	Capped	None
4026	Jumper Box 153-AX-1	241-AX-101-01A-2	None
4026	Jumper Box 153-AX-1	241-AX-102-02A-2	None
4026	Jumper Box 153-AX-1	241-AX-103-03A-2	None
4026	Jumper Box 153-AX-1	241-AX-104-04A-2	None
4026	241-AX-101-01A-2	Leak Detection Pits-01E, 02E, 03E, 04E	None
4026	241-AX-152	Jumper Box 153-AX-2	None
4030	241-AX-152	241-AX-152-B	None
4044/V029/4004/G341/4029	202A	241-A-B-VPL12	None
4101	241-AX-151	241-A-101	None
4102	241-AX-151	241-A-102	None
4103	241-AX-151	241-A-103	None
4104	241-AX-151	241-A-104	None
4105	241-AX-151	241-A-105	None
4106	241-AX-151	241-A-106	None
4242	240-S-151-U13	202-S	None
4530	241-AY-151-U4	241-A-153-U1	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
4702	241-UX-154-L-6	231-WR-TK-004	None
4703/4859	241-UX-154-L5	241-TX-155-U2	None
4851	241-UX-154-L-4	241-TX-155-U3	None
4878	241-UX-154-L-2	241-WR-TK-002	None
4977	241-UX-152-U4	241-WR-TK-001	None
5002	241-U-103-03A-U1	241-UR-152-L13	None
5006	241-U-102-02A-U1	241-UR-152-L12	None
5012	241-UR-152-U9,11,12	241-UR-151-U9	None
5014	241-U-103-03C-U1	241-UR-152-L10	None
5025	241-UR-152-U10	241-UR-151-U17	None
5032	241-U-103-03A-U2	241-UR-152-U6	None
5035	241-U-103-03C-U2	241-UR-152-U5	None
5037	241-U-102-02A-U3	241-UR-152-L15	None
5038	241-U-102-02A-U2	241-UR-152-U4	None
5041	241-U-102-02C-U2	241-UR-152-U3	None
5053	241-U-102-02C-U1	241-UR-152 Drain	None
5076	241-UR-Tank-001	U-103, 109,108,105,107,102	None
5185	241-TX-15A-U3	241-TXR-151-U11	None
5185	242-T-151-U2	242-T	None
5191	241-TX-115-15A-U1	15-X	None
5193	241-TX-115-15A-U6	15-B Valve Pit	None
5202	251-U-106-06A-U1	241-UR-153-L13	None
5206	241-U-105-05A-U1	241-UR-153-L12	None
5212	241-UR-153-U-9, 11,12	241-UR-151-U8	None
5214	241-U-106-06C-U1	241-UR-153-L10	None
5225	241-UR-151-U16	241-UR-153-U10	None
5232	241-U-106-06A-U2	241-UR-153-U6	None
5235	241-U-106-06C-U2	241-UR-153-U5	None
5237	241-U-105-05A-U3	241-UR-153-L15	None
5238	241-U-105-05A-U2	241-UR-153-U4	None
5241	241-U-105-05C-U2	241-UR-153-U3	None
5402	241-U-109-09A-U1	241-UR-154-L13	None
5406	241-U-108-08A-U1	241-UR-154-L12	None
5410	241-U-107-07A-U1	251-UR-154-L11	None
5412	241-UR-151-U6	241-UR-154-U9,11,12	None
5414	241-U-109-09C-U1	241-UR-154-L10	None
5417	241-U-108-08C-U1	241-UR-154-L7	None
5420	241-U-107-07C-U1	241-UR-154-L9	None
5425	241-UR-151-U15	241-UR-154-U10	None
5431	241-U-107-07A-U3	241-UR-154-L14	None
5432	241-U-109-09A-U2	241-UR-154-U6	None
5435	241-U-109-09C-U2	241-UR-154-U5	None
5437	241-U-108-08A-U3	241-UR-154-L15	None
5438	241-U-108-08A-U2	241-UR-154-U4	None
5441	241-U-108-08C-U2	241-UR-154-U3	None
5444	241-U-107-07A-U2	241-U-154-U2	None
5447	241-U-107-07C-U2	241-U-UR-154-1	None
5507	241-UR-154-L8	241-U-153-L8	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
5601	244-UR-Tank-001	241-U4-151-L5	None
5609	244-UR-Tank-002-U2	251-U4-151-L3	None
5613	244-UR-Tank-001-U2	241-UR-151-L1	None
5622	244-UR-Tank-001-U3	241-UR-151-L7	None
5624	241-UR-152-L8	241-UR-151-U12	None
5625	241-UR-153-U8	241-UR-151-U11	None
5626	241-UR-151-U7	241-UR-154-U8	None
5630	241-UR-152-L1,2,3,4,5,6	241-UR-151-U14	None
5631	241-UR-153-L1,2,3,4,5,6	241-UR-151-U13	None
5632	241-UR-151-U10	241-UR-154-L1,2,3,4,5,6	None
5644	241-UR-151-U-18,19,21	241-UR-151-U-18,19,21	None
5647	244-UR-U1-Tank-001	241-UR-151-L8	None
5648	244-UR-U1-Tank-002	241-UR-151-L10	None
5653	244-UR-Tank-004	241-U4-151-L4	None
6002	241-T-103-03A-U1	241-TR-152-L13	None
6006	241-T-102-02A-U1	241-TR-152-L12	None
6010	241-T-101-01A-U1	241-TR-152-L11	None
6012	241-TR-153-U13	Capped	None
6012	241-TXR-151-U10	Capped	None
6012	241-T-104	244-TX-H	None
6014	241-T-103-03C-U1	241-TR-152-L10	None
6017	241-T-102-02C-U1	241-TR-152-L7	None
6020	241-T-101-01C-U1	241-TR-152-U2	None
6025	241-TXR-151-U20	241-TR-152-U10	None
6031	241-T-101-01A-U3	241-TR-152-L14	None
6032	241-T-103-03A-U2	241-TR-152-U6	None
6035	241-T-103-03C-U2	241-TR-152-U5	None
6037	241-T-02A-U3	241-TR-152-L15	None
6038	241-T-102-02A-U2	241-TR-152-U4	None
6041	241-T-102-02C-U2	241-TR-152-U3	None
6044	241-T-101-01A-U2	241-TR-152-U2	None
6047	241-T-101-01C-U2	241-TR-152-U1	None
6053	241-T-101-01C	241-TR-152 Drain	None
6160	241-TR-152-U9, 11,12	241-TR-153-U2	None
6165	241-TR-153-U6	241-TR-152-L1, 2,3,4,5,6	None
6170	241-TR-152-U8	241-TR-153-U1	None
6202	241-BY-103-03A-U1	241-BYR-152-L13	None
6206	241-BY-102-02A-U1	241-BYR-152-L12	None
6210	241-BY-101-01A-U1	241-BYR-152-L11	None
6214	241-BY-103-03C-U1	241-BYR-152-L10	None
6217	241-BY-102-02C-U1	241-BYR-152-L7	None
6220	241-BY-101-01C-U1	241-BYR-152-L9	None
6232	241-BY-103-03D-U2	241-BYR-152-U6	None
6235	241-BY-103-03C-U2	241-BYR-152-U5	None
6238	241-BY-102-02D-U2	241-BYR-152-U4	None
6241	241-BY-102-02C-U2	241-BYR-152-U3	None
6244	241-BY-101-01D-U2	241-BYR-152-U2	None
6247	241-BY-101-01C-U2	241-BYR-152-U1	None
6249	241-BYR-152-U14	241-BXR-152-U13	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
6253	241-BYR-152/241-BXR-152	241-B-302A	None
6402	241-BYR-153-L13	241-BY-106-06A-U1	None
6406	241-BYR-153-L12	241-BY-105-05A-U1	None
6410	241-BYR-153-L11	241-BY-104-04A-U1	None
6414	241-BYR-153-L10	241-BY-106-06C-U1	None
6417	241-BYR-153-L7	241-BY-105-05C-U1	None
6420	241-BYR-153-L9	241-BY-104-04C-U1	None
6432	241-BYR-153-U6	241-BY-106-06D-U2	None
6435	241-BYR-153-U5	241-BY-106-06C-U2	None
6438	241-BYR-153-U4	241-BY-105-05D-U2	None
6441	241-BYR-153-U3	241-BY-105-05C-U2	None
6444	241-BYR-153-U2	241-BY-104-04D-U2	None
6447	241-BYR-153-U1	241-BY-104-04C-U2	None
6449	241-BYR-153-U14	241-BXR-153-U13	None
7002	241-TX-103-03A-U1	241-TXR-152-L16	None
7006	241-TX-102-02A-U1	241-TXR-152-L15	None
7010	241-TX-101-01A-U1	241-TXR-152-L14	None
7012	241-TXR-152-U10, 12,13	241-TXR-151-U8	None
7014	241-TX-103-03C-U1	241-TXR-152-L13	None
7017	241-TX-102-02C-U1	241-TXR-152-L9	None
7020	241-TX-101-01C-U1	241-TXR-152-L12	None
7025	241-TXR-152-U11	241-TXR-151-U19	None
7031	241-TX-101-01D-U1	241-TR-152-L18	None
7032	241-TX-103-03D-U2	241-TXR-152-U6	None
7035	241-TX-103-03C-U2	241-TXR-152-U5	None
7037	241-TX-102-02D-U1	241-TSR-152-L19	None
7038	241-TX-102-02D-U2	241-TXR-152-U4	None
7041	241-TX-102-02C-U2	241-TXR-152-U3	None
7044	241-TX-101-01D-U2	241-TXR-152-U2	None
7047	241-TX-101-01C-U2	241-TXR-152-U1	None
7159	241-TX-104-04A-U1	241-TXR-152-L17	None
7162	241-TX-104-04C-U1	241-TXR-152-L11	None
7164	241-TX-104-04C-U2	241-TXR-152-U7	None
7166	241-TX-104-04D-U2	241-TXR-152-U8	None
7202	241-TX-107-07A-U1	241-TXR-153-L16	None
7206	241-TX-106-06A-U1	241-TXR-153-L15	None
7210	241-TX-105-05A-U1	241-TXR-153-L14	None
7212	241-TXR-151-U6	241-TXR-153-U10, 12, 13	None
7214	241-TX-107-07C-U1	241-TXR-153-L13	None
7217	241-TX-106-06C-U1	241-TXR-153-L9	None
7220	241-TX-105-05C-U1	241-TXR-153-L12	None
7225	241-TXR-151-U18	241-TXR-153-U11	None
7231	241-TX-105-05D-U1	241-TXR-153-L18	None
7232	241-TX-107-07D-U2	241-TXR-153-U6	None
7235	241-TX-107-07C-U2	241-TXR-153-U5	None
7237	241-TX-106-06D-U1	241-TXR-153-L19	None
7238	241-TX-106-06D-U2	241-TXR-153-U4	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
7241	241-TX-106-06C-U2	241-TXR-153-U3	None
7244	241-TX-105-05D-U2	241-TXR-153-U2	None
7247	241-TX-105-05C	241-TXR-153-U1	None
7359	241-TX-115-015A-U4	241-TXR-153-L17	None
7362	241-TX-108-08C-U1	241-TXR-153-L11	None
7364	241-TX-108-08C-U2	241-TXR-153-U7	None
7366	241-TX-108-08D-U2	241-TXR-153-U8	None
7410	241-BY-111-011A-U1	241-BYR-154-L11	None
7412	241-BYR-154-U9,11,12	241-BXR-151-U4	None
7417	241-BY-112-012C-U1	241-BYR-154-L10	None
7420	241-BY-111-011C-U1	241-BYR-154-L9	None
7425	241-BYR-154-U10	241-BXR-151-U20	None
7431	241-BY-111-011D-U1	241-BYR-154-L14	None
7437	241-BY-112-012D-U1	241-BYR-154-L15	None
7438	241-BY-112-012D-U2	241-BYR-154-U4	None
7441	241-BY-112-012C-U2	241-BYR-154-U3	None
7444	241-BY-111-011D-U2	241-BYR-154-U2	None
7447	241-BY-111-011C-U2	241-BYR-154-U2	None
7601	241-TXR-244-Tank-001	241-TXR-151-L5	None
7609	241-TXR-151-L3	241-TXR-244 Tank 002-U2	None
7613	241-TXR-244-U2-Tank-003	241-TXR-151-L1	None
7616	241-TX-155-L1	241-TXR-151-U2, U3	None
7622	241-TXR-244-U3-Tank-001	241-TXR-151-L7	None
7624	241-TR-153-U14	Capped	None
7624	241-TXR-151-U14	Capped	None
7625	241-TXR-151-U13	241-TXR-153-U9	None
7624	241-TR-153-U14	Capped	None
7624	241-TXR-151-U14	Capped	None
7626	241-TXR-152-U9	241-TXR-151-U7	None
7630	241-TXR-151-U17	241-TR-153-U9	None
7631	241-TXR-151-U15	241-TXR-153-L1, 2,3,4,5,6,7,8	None
7632	241-TXR-152-L1, 2,3,4,5,6,7,8	241-TXR-151-U12	None
7636	241-TXR-151-U5	241-TX-153-L5	None
7644	241-TXR-151-U21, 23, 25	241-TXR-151-U21, 23, 25	None
7647	241-TXR-244-U1-Tank-003	241-TXR-151-L8	None
7648	241-TXR-244-U1-Tank-002	241-TXR-151-L10	None
7765	244-UR Tank 002	241-UR-151 Drain	None
8002	241-C-103-03A-U1	241-CR-152-L13	None
8006	241-C-102-02A-U1	241-CR-152-L12	None
8010	241-C-101-01A-U1	241-CR-152-L11	None
8012	241-CR-152-U9, U11, U12	241-CR-151-U4	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
8014	241-C-103-03C-U1	241-CR-152-L10	None
8017	241-C-102-02C-U1	241-CR-152-L7	None
8020	241-C-101-01C-U1	241-CR-152-L9	None
8021	241-AY-152-U10	241-AX-103-03D-U3	None
8022	241-AY-152-U11	241-AX-103-03C-U5	None
8023	241-AY-152-U14	241-AX-102-02C-U3	None
8024	241-AY-152-U15	241-AX-102-02D-U5	None
8025	241-AY-152-U12	241-AX-101-01D-U3	None
8026	241-AY-152-U13	241-AX-101-01C-U5	None
8027	241-AY-152-U16	241-AX-104-04C-U3	None
8028	241-AY-152-U17	241-AX-104-04D-U5	None
8029	241-AX-103-03A-U4	241-AX-103-03C-U3	None
8030	241-AX-103-03B-U3	241-AX-103-03D-U5	None
8031	241-AX-103-03A-U9	241-AX-103-03B-U5	None
8031	241-C-101-01A-U3	241-CR-152-L14	None
8032	241-AX-104-04D-U3	241-AX-104-04B-U5	None
8032	241-C-103-03A-U2	241-CR-152-U6	None
8033	241-AX-104-04A-U4	241-AX-104-04B-U3	None
8034	241-AX-104-04C-U5	241-AX-104-04A-U4A	None
8035	241-AX-102-02C-U4	241-AX-102-02A-U7	None
8035	241-C-103-03C-U2	241-CR-152-U5	None
8036	241-AX-102-02A-U4	241-AX-102-02B-U3	None
8037	241-AX-102-02B-U5	241-AX-102-02D-U3	None
8037	241-C-102-02A-U3	241-CR-152-L15	None
8038	241-AX-101-01AU4	241-AX-101-01C-U3	None
8038	241-C-102-02A-U2	241-CR-152-U4	None
8039	241-AX-101-01A-U9	241-AX-101-01B-U5	None
8040	241-AX-101-01B-U3	241-AX-101-01D-U5	None
8041	241-AX-101-01A-U6	241-AX-101-01C-U4	None
8041	241-C-102-02C-U2	241-CR-152-U3	None
8042	241-AX-102-02C-U5	241-AX-102-02A-U9	None
8043	241-AX-103-03A-U6	241-AX-103-03C-U4	None
8044	241-AX-104-04C-U4	241-AX-104-04A-U7	None
8044	241-C-101-01A-U2	241-CR-152-U2	None
8047	241-C-101-01C-U2	241-CR-152-U1	None
8061	241-AY-152-L7	241-AX-104-04A-U5	None
8062	241-AX-102-02A-U5	241-AY-152-L6	None
8063	241-AY-152-L5	241-AX-101-01A-U8	None
8064	241-AY-152-L4	241-AX-102/241-AX-103	None
8202	241-C-106-06A-U1	241-CR-153-L13	None
8206	241-C-105-05A-U1	241-CR-153-L12	None
8210	241-C-104-04A-U1	241-CR-153-L11	None
8214	241-C-106-06C-U1	241-CR-153-L10	None
8217	241-C-105-05C-U1	241-CR-153-L7	None
8220	241-C-104-04C-U1	241-CR-153-L9	None
8225	241-CR-153-U10	241-CR-151-U10	None
8231	241-C-104-04A-U3	241-CR-153-L14	None
8232	241-C-106-06A-U2	241-CR-153-U6	None
8235	241-C-106-06C-U2	241-CR-153-U5	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
8237	241-C-105-05A-U3	241-CR-153-L15	None
8238	241-C-105-05A-U2	241-CR-153-U4	None
8241	241-C-105-05C-U2	241-CR-153-U3	None
8244	241-C-104-04A-U2	241-CR-153-U2	None
8247	241-C-104-04C-U2	241-CR-153-U1	None
8552	241-C-201,202,203,204-U2	241-CR-151-U2	None
8555	241-CR-151-U5	241-C-201,202,203,204-U2	None
8601	241-CR-151-L1	244-CR-Tank-001	None
8616	241-CR-151-L5	244-CR-Tank-011-U1	None
8624	241-CR-152-U8	241-CR-151-U7	None
8625	241-CR-153-U8	241-CR-151-U6	None
8630	241-CR-152-L1, 2,3,4,5,6	241-CR-151-U9	None
8631	241-CR-153-L (1-6)	241-CR-151-U8	None
8644	241-CR-151-U12, 13,15	241-CR-151-U12,U13,U15	None
8647	241-CR-151-L4	244-CR-Tank-003-U1	None
8648	241-CR-151-L6	244-CR-Tank-002-U1	None
8653/8618	241-ER-151-L9	241-CR-151-U14	None
8656	241-AX-151	244-CR DCRT Tank 003	None
8900	201-C Valve Box	244-CR-Tank-003-U10	None
9002	241-B-103-03A-U1/03B-U2	241-BR-152-L13	None
9006	241-B-102-02A-U1/02B-U2	241-BR-152-L12	None
9010	241-B-101-01A-U1/01B-U2	241-BR-152-L11	None
9012	241-BXR-151-U8	241-BR-152-U9	None
9014	241-B-103-03C-U1	241-BR-152-L10	None
9017	241-B-102-02C-U1	241-BR-152-L7	None
9020	241-B-101-01C-U1	241-BR-152-L9	None
9025	241-BXR-151-U19	241-BR-152-U10	None
9031	241-B-101-01A-U3	241-BR-152-L14	None
9032	241-B-103-03A-U2	241-BR-152-U6	None
9035	241-B-103-03C-U2	241-BR-152-U5	None
9037	241-B-102-02A-U3	241-BR-152-L15	None
9038	241-B-102-02A-U2	241-BR-152-U4	None
9041	241-B-102-02C-U2	241-BR-152-U3	None
9044	241-B-101-01A-U2	241-BR-152-U2	None
9047	241-B-101-01C-U2	241-BR-152-U1	None
9202	241-BX-103-03A-U1	241-BXR-152-L13	None
9206	241-BX-102-02A-U1	241-BXR-152-L12	None
9212	241-BYR-152-U9,U11,U12	241-BXR-151-U6	None
9212	241-BYR-152-U9,U11,U12	241-BXR-152-U9,U11,U12	None
9214	241-BX-103-03C-U2	241-BXR-152-L10	None
9217	241-BX-102-02C-U1	241-BXR-152-L7	None
9225	241-BYR-152-U10	241-BXR-151-U18	None
9225	241-BYR-152-U10	241-BXR-152-U10	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
9231	241-BX-101-01A-U3	241-BXR-152-L14	None
9232	241-BX-103-03A-U2	241-BXR-152-U6	None
9235	241-BX-103-03C-U1	241-BXR-152-U5	None
9237	241-BX-102-02A-U3	241-BXR-152-L15	None
9238	241-BX-102-02A-U2	241-BXR-152-U4	None
9241	241-BX-102-02C-U2	241-BXR-152-U3	None
9244	241-BX-101-01A-U2	241-BXR-152-U2	None
9247	241-BX-101-01C-U2	241-BXR-152-U1	None
9249	241-BYR-152-U13	241-BXR-152-U14	None
9256	241-BX-103-03B-U2	241-BX-103-03A-U1	None
9263	241-BX-102-02B-U2	241-BX-102-02A-U1	None
9270	241-BX-101-01B-U2	241-BX-101-01A-U1	None
9412	241-BYR-153-U9,U11,U12	241-BXR-151-U3	None
9414	241-BX-106-06C-U1	241-BXR-153-L10	None
9417	241-BX-105-05C-U1	241-BXR-153-L7	None
9420	241-BX-104-04C-U1	241-BXR-153-L9	None
9425	241-BYR-153-U10	241-BXR-151-U17	None
9425	241-BYR-153-U10	241-BXR-153-U10	None
9431	241-BX-104-04A-U3	241-BXR-153-L14	None
9432	241-BX-106-06A-U2	241-BXR-153-U6	None
9435	241-BX-106-06C-U2	241-BXR-153-U5	None
9437	241-BX-105-05A-U3	241-BXR-153-L15	None
9438	241-BX-105-05A-U2	241-BXR-153-U4	None
9441	241-BX-105-05C-U2	241-BXR-153-U3	None
9444	241-BX-104-04A-U2	241-BXR-153-U2	None
9447	241-BX-104-04C-U2	241-BXR-153-U1	None
9449	241-BYR-153-U13	241-BXR-153-U14	None
9463	241-BX-105-05B-U2	9406/9463/241-BX-105-05A-U1	None
9465	241-BX-106-06B-U2	9402/9456/241-BX-106-06A-U1	None
9601	244-BXR-Tank-001	241-BXR-151-L1	None
9604	244-BXR-Tank-003	244-BXR Tank-O01-U2	None
9613	244-BXR-Tank-003-U2	244-BXR Tank 011	None
9616	244-BXR-011-U1	241-BXR-151-L5	None
9622	244-BXR-Tank-001-U3	241-BXR-151-L3	None
9623	241-BYR-154-U8	241-BXR-151-U15	None
9624	241-BXR-151-U12	241-BR-152-U8	None
9626	241-BYR-153-U8	241-BXR-151-U5	None
9626	241-BYR-153-U8	241-BXR-153-U8	None
9630	241-BXR-151-U15	241-BR-152-L1	None
9631	241-BXR-151-U13	241-BXR-152-L1,L2,L3,L4,L5,L6	None
9631	241-BXR-151-U13	241-BYR-152-L1,L2,L3,L4,L5,L6	None
9632	241-BXR-151-U10	241-BYR-151-L1,L2,L3,L4,L5,L6	None
9632	241-BXR-151-U10	241-BXR-153-L1,L2,L3,L4,L5,L6	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
9633	241-BYR-154-L1,L2,L3,L4,L5	241-BXR-151-U9	None
9636	241-BXR-151-U2	241-B-252-U8	None
9644	241-BXR-151-U21,U23,U25	241-BXR-151-U21,U23,U25	None
9647	244-BXR-Tank-003-U1	241-BXR-151-L4	None
9648	244-BXR-Tank-002-U1	241-BXR-151-L6	None
9719	241-BXR-151-U24	241-ER-151-L3	None
9765	241-BXR-151-Drain	244-BXR Vault	None
01A	241-A-101-01A-U7	241-A-153-U5	None
01B	241-A-101-01B-U1	241-A-153-L10	None
01C	241-A-101-01C-U1	241-A-153-L9	None
02A	241-A-102-02A-U7	241-A-153-U4	None
02B	241-A-102-02B-U1	241-A-153-L11	None
03A	241-A-103-03A-U7	241-A-153-U6	None
03B	241-A-103-03B-U1	241-A-153-L12	None
03C	241-A-103-03C-U1	241-A-153-L7	None
04B	241-A-104-04B-U1	241-A-153-L4	None
04C	241-A-104-04C-U1	241-A-153-L3	None
05B	241-A-105-05B-U1	241-A-103-03A-U4	None
05B	241-A-105-05B-U1	241-A-153-L6	None
05C	241-A-105-05C-B	241-A-103-03D/241-A-153-U2	None
05D	241-A-105-05D-U1	241-A-153-L2	None
06A	241-A-106-06A-U7	241-A-153-U3	None
06B	241-A-106-06B-U1	241-A-153-L5	None
06C	241-A-106-06C-U1	241-A-153-L1	None
108/837/8649/8901	221-B	244-CR DCRT	None
153A	241-A-101	241-A-153-Drain	None
223/224/225/226	244-BX-Vault	241-B-106, 105,109	None
223/Unknown	244-BX-Vault	241-B-103	None
Unknown	241-A-102-02C-U1	241-A-153-L8	None
227/228	244-BX-Vault	241-B-108, 111	None
231/232/233/234	244-BX-Vault	241-B-104, 107,110	None
4044	241-AX-151-G Cell	Capped	None
4005/810	241-AX-151-D Cell	244-AR Vault-T9	None
4006	241-AX-151-E Cell	Capped	None
4006/4018	244-AR Vault-T9A	241-AX-152-A	None
4107VO33	241-AX-151-D Cell	241-A-152-U11	None
4510/A107	241-AX-152-7	Capped	None
4859/4703	241-TX-155-U2	241-UX-154-L5	None
5107	241-UR-152-L8	5107/V473/241-UR-153-L11	None
5307	241-UR-153-L8	5107/V473/241-UR-152-L11	None
5507	241-UR-154-L8	5107/V473/241-UR-152-L11	None
6307/V336	241-BYR-152-L8	241-BX-153-U2	None
6443/9453	241-BYR-153 & 241-BXR-	241-BX-104-04C	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
	153 Drains		
7406/9394	241-BY-109-09A-U4	241-BYR-154-L12	None
7406/9394	241-BY-112-012A-U1	241-BY-109-09A-U4	None
7435/9385/V304	241-BYR-154-U5,L13	241-B-252-L15	None
7507/9712	241-BYR-154-L8	B-Swamp	None
814/4015	241-AX-151	Capped	None
819/818	241-BX-106-06A-U4	241-BX-110010C-C	None
833/8618/8612/809	221-B	244-AR Vault-T16A	None
834/8615/8653/818	221-B	244-AR Vault-T10	None
8107	241-CR-152-L8	V844/241-CR-151-L8	None
8636/V105	241-CR-151-U1	241-C-151-L6	None
9210/9270	241-BX-101-01B-U2	241-BXR-152-L11	None
9406/9463	241-BX-105-05A-U1	241-BXR-153-L12	None
9456/9402	241-BX-106-06A-U1	241-BXR-153-L13	None
9470/9410	241-BX-104-04B-U2/04A-U1	241-BX-104-04A/241-BXR-153-L11	None
9625/9212	241-BXR-151-L11	241-BYR-152-U8	None
9625/9212	241-BXR-151-L11	241-BXR-152-U8	None
9653/141	221-B	Capped	None
9653/243	221-B	241-ER-151-L7	None
A101	241-AX-101	241-AX-152-A1	None
A102	241-AX-102	241-AX-152-A2	None
A-103	241-AX-103	241-AX-152-A3	None
A-104	241-AX-104	241-AX-152-A4	None
A4013	241-CR-152-3A	241-AX-151-Washdown	None
B101	241-AX-101	241-AX-152-B1	None
B102	241-AX-102	241-AX-152-B2	None
B-103	241-AX-103	241-AX-152-B3	None
B-104	241-AX-104	241-AX-152-B4	None
BWCTL	241-B-103-03A-C	241-B-106-06A-A	None
BWCTL-M2	241-B-102-02A-A	241-B-108-08A-C	None
C101	241-AX-101	241-AY-501	None
C102	241-AX-102	241-AY-501	None
C-103	241-AX-103	241-AY-501	None
C-104	241-AX-104	241-AY-501	None
D020	PUREX	241-A-151-U19	None
D040	PUREX	241-A-151-U19	None
D070	PUREX	241-A-151-U26	None
D088	PUREX	241-A-151-U25	None
D149	PUREX	241-A-151-U18	None
D186	PUREX	241-A-151-U5	None
D601D505	241-AZ-152	241-AY-152	None
E006	PUREX	241-A-151-U24	None
E167	PUREX	241-A-151-U23	None
F241	PUREX	241-A-151-U21	None
F274	PUREX	241-A-151-U9	None
F377	PUREX	241-A-151-U14	None
F429	PUREX	241-A-151-U13	None
F719	PUREX	241-A-151-U20	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
F791	PUREX	241-A-151-U8	None
G057	PUREX	241-A-151-U17	None
G180	PUREX	241-A-151-U11	None
G212	PUREX	241-A-151-U16	None
M044	PUREX	241-A-151-U10	None
M045	PUREX	241-A-151-U22	None
R-165	PUREX	241-A-151-U12	None
R345	PUREX	241-A-151-U15	None
U039	PUREX	241-A-151-U6	None
U136	PUREX	241-A-151-U7	None
Drain	241-TX-101	241-TXR-152	None
Drain	241-TX-105-05D	241-TXR-153	None
Drain	241-TX-302A	241-TX-153	None
Drain	241-TX-302A	Crib	None
Drain	241-TX-302B	Encasement Drain	None
Drain	241-TX-302B	241-TX-155	None
Drain	241-TXR-244-002-Sump	241-TXR-151	None
Drain	241-TY-302A	241-TY-153	None
Drain	241-U-102-02A	P19 K1 Exhauster	None
Drain	241-U-102-02A-C	Clean Out Boxes-U32,33,34,35	None
Drain	241-U-105-05C-B	241-UA, 241-UB Flush Pits	None
Drain	241-U-105-05C-U1	241-UR-153	None
Drain	241-U-107-07A-B	Clean Out Box-U30,U31	None
Drain	241-U-107-07C	241-UR-154	None
Drain	241-U-108-08A-B	P-20 Exhauster	None
Drain	241-U-108-08A-C	Clean Out Box U-29	None
Drain	241-U-105-05C-C	241-U-A/241-U-B Flush Pits	None
Drain	241-U-111-11A-E	241-U-C/241-U-D Flush Pits	None
Drain	241-U-301-B	241-U-152	None
Drain (BX-302B)	241-BX-155	241-BX-302C	None
Drain Line	241-B-302B	241-B-154	None
Drain Line	241-BX-302B	241-BX-154	None
Drain Line	241-BYR-154	244-BXR Vault-002	None
Drain Line	241-C-102-02B-U3	241-C-Valve Pit-L1	None
Drain Line	241-C-103	241-C-Valve Pit	None
Drain Line	241-C-104-04C	241-CR-153	None
Drain Line	241-C-104-04B-U3	241-C-Valve Pit-L2	None
Drain Line	241-C-107-U1	241-C-Valve Pit-L3	None
Drain Line	241-C-252	Unknown Catch Tank	None
Drain Line	241-C-153 & 241-C-151	Unknown Catch Tank	None
Drain Line	241-S-102-02A-F	241-S-152	None
Drain Line	241-S-107	241-S-B Flush Pit	None
Drain Line	241-S-107	241-S-C Flush Pit	None
Drain Line	241-S-107	241-S-D Flush Pit	None
Drain Line	241-S-302-B	241-S-302-A	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
Drain Line	244-CR-Tank-002	241-CR-151	None
Drain-301	241-C-106-06C-U8	To Metal Filter Drain	None
Drain-301	241-A Farm COBs	241-A-350	None
Drain 302	241-C-106-06C-U9	To Process Building Floor Drain	None
Drain 302	COB A-2	DR-301/241-A-350	None
Drain 303	COB A-5	DR-301/241-A-350	None
Drain 304	COB A-9	DR-301/241-A-350	None
Drain-305	241-A-B Flush Pit	DR-301/241-A-350	None
Drain-306	241-A-A Flush Pit	DR-301/241-A-350	None
Drain-307	241-A-A, A-B Flush Pits	241-A-350	None
Drain-308	COB A-3	DR-301/A-350	None
Drain-309	COB A-4	DR-301/A-350	None
Drain-314	241-AX-COBs	DR-301/A-350	None
Drain-315	COB A-10	DR-317/DR-301/241-A-350	None
Drain-316	COB A-8	DR-317/DR-301/241-A-350	None
Unknown	COB A-11	DR-317/DR-301/241-A-350	None
Drain-318	COB AX-12	DR314/241-AX-102 Riser 24	None
Drain-319	COB AX-14	DR314/241-AX-102 Riser 24	None
Drain-320	COB AX-15	DR314/241-AX-102 Riser 24	None
Drain-321	COB AX-16	DR314/241-AX-102 Riser 24	None
Drain-322	COB AX-17	DR314/241-AX-102 Riser 24	None
Drain-323	COB AX-18	DR314/DR370/241-AX-102 Riser 24	None
Drain-324	COB AX-21	DR314/DR370/241-AX-102 Riser 24	None
Drain-329	COB AX-19	DR314/DR370/241-AX-102 Riser 24	None
Drain-330	COB AX-24	DR325/241-AX-104 Riser 7C	None
Drain-331	COB AX-22	DR314/DR370/241-AX-102 Riser 24	None
Drain-332	COB AX-23	DR314/DR370/241-AX-102 Riser 24	None
Drain-341	C0B A-1	DR-301/241-A-350	None
Drain-342	C0B AX-26	DR333/DR325/241-AX-107 Riser 7C	None
Drain-347	C0B AX-20	DR325/DR307/241-AX-107 Riser 7C	None
Drain-348	C0B AX-25	DR333/DR325/241-AX-107 Riser 7C	None
Drain-349	COB AX-13	DR314/241-AX-102	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
		Riser 24	
Drain	241-BX-153 Drain	241-B-302A	None
Drain-0029	241-AX-153 Jumper Box	241-AX-152	None
CNDS-02	241-A-401 Condensate Bldg	241-A-401Diverter Caisson	None
CDNS-92	241-A-401 Condensate Bldg	241-A-401Diverter Caisson	None
CDNS-AN-02	241-A-401Diverter Caisson	241-AN-101-01D-B	None
CDNS-AN-92	241-A-401Diverter Caisson	241-AN-101-01D-A	None
Flush	241-UA-L6, L8, L17	241-UA Flush Pit	None
Flush	241-UB-R-17, R-8, R-6	241-UB Flush Pit	None
Flush	241-UC-L6, L8, L17	241-UC Flush Pit	None
Flush	241-UD-R6, R8, R17, R21	241-UD-Flush Pit/R-8	None
Flush Line	241-A-A Flush Pit	241-A-A-L6, L8, L17	None
Flush line	241-A-B-Flush Pit	241-A-102-02B-4	None
Flush Line	241-A-B-R8, R6,R17	241-A-B Flush Pit	None
Flush Line	241-AX-A-L6,L8,L17	241-AX-A-Flush Pit	None
Flush Line	241-AX-B-R6,R8,R17	241-AX-B-Flush Pit	None
Flush Line	241-S-A-L8/L17	241-S-A Flush Pit	None
Flush Line	241-S-B-R6,R8,R17	241-S-B Flush Pit	None
Flush Line	241-S-C-L8,L17	241-S-C Flush Pit	None
Flush Line	241-S-D-R6,R8,R17	241-S-D Flush Pit	None
Flush Line	241-SX-A-L6,L17	241-SX-A Flush Pit	None
Flush Line	241-SX-A-R6,R17	241-SX-B Flush Pit	None
No number	241-UA-L18,L19	241-UB-R18,R19	None
Overflow	241-A-106 Sidewall	241-A-350 Sidewall	None
PL2021	242-B	241-B-106	None
PL-P11	241-BY-112-012D-5A	241-BY-109-09A-U6	None
PL-P22	241-BY-109	241-BY-108-08A-C	None
SL101	241-S-152-Nozzle 1	Blocked	None
SL101	241-UD-R3	Blocked	None
SL102	241-UC-L10	241-UA-L3	None
SL-102	241-A-106-06D-A	241-A-B-R7/COB A8,A9	None
SL104	241-U-109-09B-A	241-UC-L7	None
SL105	241-U-108-08B-A	241-UC-L9	None
SL-105	241-A-103-03D-A	241-A-B-R5	None
SL-106	241-A-B-R10	241-A-102-02D-A	None
SL108	241-U-107-07B-A	241-UD-R9	None
SL108	241-U-110-10B-A	241-UD-R7	None
SL109	241-U-103	241-U-B	None
SL110	241-U-06B	241-UA-L9	None
SL111	241-AX-103-03A-A	241-AX-A-L	None
SL112	241-AX-104-04A-A	241-AX-B-R	None
SL112	241-U-105-05B-A	241-U-A-L7	None
SL115	241-S-A	241-S-C	None
SL116	211-S-B-R10	241-S-D-R3	None
SL117	241-S-C	241-SX-A	None
SL118	241-S-D	241-SX-B	None
SL119	241-S-103-03A-B	241-S-A-L7	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
SL120	241-S-106-B	241-S-A-L9	None
SL-121	241-S-101-01A-B	241-S-B-R5	None
SL122	241-S-105-05A	241-S-B-R9	None
SL123	241-S-109-09A-B	241-S-C-L7	None
SL124	241-S-108-08A-B	241-S-C-L5	None
SL125	241-S-112-12A-B	241-S-C-L9	None
SL126	241-S-D	None Identified	None
SL127	241-S-110-10A	241-S-D-R7	None
SL128	241-S-111-11A-B	241-S-D-R9	None
SL129	241-SX-103	241-SX-A	None
SL130	241-SX-102-02B-B	241-SX-A-L5	None
SL131	241-SX-106-06A-B	241-SX-151-L9	None
SL132	241-SX-105	241-SX-B-R9	None
SL133	241-SX-104-04A-B	241-SX-B-R7	None
SL134	241-S-A-L18	241-S-D-R18	None
SL137	241-SX-101-01A	241-SX-B-R5	None
SL138	241-S-152	242-S Evaporator	None
SL139	241-S-152-4	Capped	None
SL139/SL114	242-S Evaporator	241-S-B	None
SL175	241-S-152-8	Failed	None
SL175/S138	241-SY-A-L3	242-S Evaporator	None
SL176	241-S-152	Failed	None
SL204	241-U-109-09A-A	241-UC-L14	None
SL219	241-S-103-03A-A	241-S-A-L15	None
SN200	241-S-102	241-S-152-5	None
SN200	241-TX-116	244-TX-E	None
SN-200	241-BY-102-02A-U2	SN-200/Capped	None
SN201	241-S-102	241-S-152-7	None
SN201	241-TX-113-13A	SN206	None
SN-201	241-BY-103-U2	SN-200/Capped	None
SN202	241-UC-L12	241-UA-L1	None
SN-202	241-A-B-R11	241-A-106-06C-Nozzle A	None
SN-202	241-BY-105-05A-U2	SN-200/Capped	None
SN203	SN206	241-TX-105-05A	None
SN203	241-BY-106-06A-U2	SN200/Capped	None
SN205	241-U-108-08A-A	241-UC-L15	None
SN203	241-UC-R12	241-UB-R2	None
SN204	244-TX-D	241-TX-117-017A	None
SN-204	241-BY-108-08A-U1	SN207/Capped	None
SN205	SN204	241-TX-114-014A	None
SN-205	241-A-103-03C-A	241-A-B-R14	None
SN-205	241-BY-109-09A-U5	SN207/Capped	None
SN206	SN204	241-TX-110-01A	None
SN206	241-U-107-07A-A	241-UD-R14	None
SN-206	241-A-102-02C-3	241-A-102-02B-3	None
SN-206	241-BY-111-011A-U2	Capped	None
SN207	241-TX-106-06A	SN204	None
SN207	251-U-111-11A-A	241-UD-R20	None
SN-207	241-A-A-L14	241-A-101-01B-A	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
SN-207	241-BY-103-03A	244-BX-D	None
SN-207	241-BY-112-012A	801	None
SN208	241-TX-118-18A	244-TX-C	None
SN-208	241-AX-101-01B-A	241-AX-A-L15	None
SN209	241-TX-115-15A	SN208	None
SN209	241-U-103-03A-A	241-UB-R-15	None
SN-209	241-AX-102-02D-A	241-AX-B-R14	None
SN210	241-TX-111-11A	SN208	None
SN210	241-U-106-06C-A	241-UA-L16	None
SN-210	241-AX-A-L19	241-AX-B-R19	None
SN211	241-AX-103-03D-A	241-AX-A-L14	None
SN-211	241-BY-110-010-A/BY-104-04-U2	244-BX-Nozzle B	None
SN211	241-U-102-02A-A	241-UB-R14	None
SN212	241-AX-104-04B-A	241-AX-B-R15	None
SN212	241-U-105-05C-A	241-UA-L14	None
SN212	241-TX-108-08A	SN211	None
SN213	241-S-102	241-S-A-L1	None
SN213	241-U-111-11A-C	241-UC-L15	None
SN211	241-TX-112-012A	244-TX-B	None
SN213	241-TX-101-01A	SN211	None
SN214	241-TX-102-02A	SN211	None
SN214	241-S-102	241-SB-R1	None
SN215	241-U-111-11A-B	241-UD-R15	None
SN215	241-TX-103-03A	SN211	None
SN215	241-S-A-L14	241-S-C-L1	None
SN216	241-S-152-9	Capped	None
SN216	241-S-B-R12	241-S-D-R1	None
SN216/217	241-BX-107/241-BX-110	244 BX-Nozzle E	None
SN217	241-S-C-L12	241-SX-A-L1	None
SN218	241-S-D-R12	241-SX-B-R1	None
SN220	241-S-106-06A-A	241-S-A-L16	None
SN221	241-S-101-01A-A	241-S-B-R14	None
SN222	241-S-105-05A	241-S-B-R16	None
SN223	241-S-109-09A-A	241-S-C-L15	None
SN224	241-S-108-08A-A	241-S-C-L14	None
SN225	241-S-112-12A-A	241-S-C-L16	None
SN226	241-S-107-07A-A	241-S-D-R14	None
SN227	241-S-110-10A	241-S-D-R15	None
SN228	241-S-111-11A-A	241-S-D-R16	None
SN229	241-SX-103-03B-A	241-SX-A-L15	None
SN230	241-SX-102-02B-A	241-SX-A-L14	None
SN-230/215/214/213	241-BX-104-04B-U1	244-BX-Nozzle A	None
SN231	241-SX-106-06A-A	241-SX-A-L16	None
SN233	241-SX-104-04A-A	241-SX-B-R15	None
SN-235	241-A-102-02B-2	Capped off	None
SN239	241-S-C-L19	241-S-D-R19	None
SN241	241-SX-101-01A-A	241-SX-B-R14	None
SN242	241-S-102-02A-U6	241-S-A-L12	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
SN245	241-S-107-07A	244-S-18	None
SN246	241-S-107-07A	244-S-17	None
SN246	241-S-107-07A-B	241-S-D-R2	None
SN247	241-S-107-07A	244-S-16	None
SN248	241-S-107-07A	244-S-15	None
SN249	241-S-107-07A	244-S-14	None
SN249	244-TX-A	704	None
SN264	241-UD-R5	244-U-A	None
SN265	241-UD-R4	244-U-B	None
SN266	244-U-C	Capped	None
SN275	241-C-VP-U1,U2,U3,U4,U5,U6	244-CR-U15	None
SN281	241-S-152-10	Failed	None
SN282	241-S-152-11	Failed	None
SN-283	242-S Evaporator	241-SY-02E-A	None
SN-284	242-S Evaporator	241-SY-02E-B	None
7624	244-TX-I	241-T-111	None
7624	244-TX-I	244-T-109	None
Unknown	244-AR-Tank001-T15	244-AR-Tank-004-T4	None
U039	PUREX	241-A-151-U6	None
U136	PUREX	241-A-151-U7	None
SL103	241-U-B	241-U-D-R10	None
SL107	241-A-01H	241-A-A-L5	None
SL108	241-AX-01A	241-AX-A-L9	None
SL111	241-U-02B	241-U-B	None
SL113	241-U-C	241-U-D	None
SL114	241-U-B	241-U-A	None
SL138	241-S	SL-175	None
SL140	241-S-102	241-S-A	None
SN204	241-U-09A	241-U-C	None
SN216/SN282	241-U-D	241-SY-B-L3	None
V517	202-S	241-S-151	None
Unknown	241-A-104-04A-U1	241-A-101-01A-U1	None
Unknown	241-A-104-04A-U2	241-A-105-05C-A	None
Unknown	241-A-105-05A-U1	241-A-102-02A-U1	None
Unknown	241-A-106-06A-U1	241-A-103-03A-U1	None
Unknown	241-B-111	241-B-110	None
Unknown	241-B-112	241-B-111	None
Unknown	241-B-201	241-B-109	None
Unknown	241-BX-102	241-BX-101	None
Unknown	241-BX-103	241-BX-102	None
Unknown	241-BY-106-06D, C	241-BY-109	None
Unknown	241-BY-112	241-BY-111	None
Unknown	241-C-101	241-C-102	None
Unknown	241-C-102	241-C-103	None
Unknown	241-C-101-01B-U1	8010	None
Unknown	241-C-102-02B-U2	Line 8006	None
Unknown	241-C-103-03B-U1	241-C-Valve Pit-L6	None
Unknown	241-C-103-03B-U2	Line 8002	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
Unknown	241-C-104-04B-U2	Line 8210	None
Unknown	241-C-104-04B-U3	241-C-Valve Pit-L2	None
Unknown	241-C-10505B-U3	Capped	None
Unknown	241-C-105-05B-U2	Line 8206	None
Unknown	241-C-106-06B-U2	Line 8202	None
Unknown	241-C-108	241-C-107	None
Unknown	241-C-109	241-C-108	None
Unknown	241-C-110-U1	241-C-Valve Pit-L3	None
Unknown	241-C-111	241-C-110	None
Unknown	241-C-112	241-C-111	None
Unknown	241-C-112	241-C-Valve Pit-L5	None
Unknown	241-S-102-BB/B	Flush Pit	None
Unknown	241-S-103	Clean Out Boxes-9, 10	None
Unknown	241-S-109	Clean Out Boxes-13, 14	None
Unknown	241-S-A-L19	241-S-B-R19	None
Unknown	241-S-C-L18	241-S-D-R18	None
Unknown	241-SX-106	Clean Out Boxes-24, 25	None
Unknown	241-SX-A-L18	241-SX-B-R18	None
Unknown	241-SX-A-L19	241-SX-B-R19	None
Unknown	241-T-101	241-T-102	None
Unknown	241-T-101	241-T-102-02B-U3	None
Unknown	241-T-101-01B-U2	6010	None
Unknown	241-T-101-01B-U3	241-T-105	None
Unknown	241-T-102	241-T-103	None
Unknown	241-T-102-02B-U2	6006	None
Unknown	241-T-103-03B-U2	6002	None
Unknown	241-T-104	241-T-105	None
Unknown	241-T-105	241-T-106	None
Unknown	241-T-107	241-T-108	None
Unknown	241-T-108	241-T-109	None
Unknown	241-T-110	241-T-111	None
Unknown	241-T-111	241-T-112	None
Unknown	241-TX-117	241-TX-118	None
Unknown	241-T-201	241-T-101	None
Unknown	241-T-202	241-T-101	None
Unknown	241-T-203	241-T-101	None
Unknown	241-T-204	241-T-101	None
Unknown	241-TX-105	241-TX-106	None
Unknown	241-TX-106-06A-D	241-TX-107-07A-C	None
Unknown	241-TX-107	241-TX-108	None
Unknown	241-TX-109	241-TX-110	None
Unknown	241-TX-109-09A-C	241-TX-05A-A	None
Unknown	241-TX-110	241-TX-111	None
Unknown	241-TX-110A-A	241-TX-106-06A-C	None
Unknown	241-TX-111	241-TX-112	None
Unknown	241-TX-113	241-TX-114-14A	None
Unknown	241-TX-113	241-TX-114	None
Unknown	241-TX-114	241-TX-115	None
Unknown	241-TX-115	15-X (V615)	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
Unknown	241-TX-116	241-TX-117	None
Unknown	241-TX-117	241-TX-118	None
Unknown	241-TXR-244-Tank-002	241-TXR-244-U1-Tank-001	None
Unknown	241-TXR-244-Tank-003	241-TXR-244-U2-Tank-001	None
Unknown	241-TY-101	241-TY-102	None
Unknown	241-TY-103	241-TY-104	None
Unknown	241-TY-103-03A-A	241-TY-103-C	None
Unknown	241-TY-105	241-TY-106	None
Unknown	242-TA	242-T	None
Unknown	241-UA-L18	241-UB-R-18	None
Unknown	241-UA-L19	241-UB-R19	None
Unknown	241-UC-L18	241-UD-R18	None
Unknown	241-UC-L19	241-UD-R19	None
Unknown	241-UX-302A	291-U Stack	None
Unknown	242-B	241-B-106	None
Unknown	242-S Evaporator	241-S-103	None
Unknown	244-BXR-Tank-002-U2	244-BXR-011	None
Unknown (02C)	241-A-102-02C-U1	241-A-153-L8	None
V004	241-A-152-U2	241-A-151-L22	None
V005	241-A-152-U8	241-A-151-L21	None
V006	241-A-152-U4	241-A-151-L20	None
V007	241-A-152-U6	241-A-151-L17,L18,L19	None
V008	241-A-152-U10	241-A-151-L14,L15,L16	None
V-011	241-A-151-L7,L9	Crib	None
V-014	241-A-151-L5,L6,L11,L12	Tank 216A	None
V-016	241-A-151-L3,L4,L10	Crib	None
V021	241-A-151-L25	241-AW-A-L12	None
V022	241-A-151-L-24	241-AW-B-R12	None
V023	241-A-151-L23	241-AW-B-R11	None
V029	241-A-151-UC	241-A-151-UD	None
V031	241-A-151-UA	241-A-151-UF	None
V032	241-A-106-A-U1/103-03A-U1	241-A-152-U7	None
V038	241-A-152-L6	241-A-101	None
V039	241-A-152-L5	241-A-101	None
V040	241-A-152-L4	241-A-102	None
V041	241-A-152-L3	241-A-102	None
V042	241-A-103	241-A-152-L2	None
V043	241-A-103	241-A-152-L1	None
V044	241-A-152-L10	241-A-104	None
V045	241-A-152-L11	241-A-104	None
V046	241-A-152-L12	241-A-105	None
V047	241-A-152-L13	241-A-105	None
V048	241-A-106	241-A-152-L14	None
V049	241-A-106	241-A-152-L15	None
V050	241-A-152-L7	241-C-104	None
V051	241-A-152-L8	241-C-104	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V052	241-A-152-L9	Capped	None
V058	241-A-152-A	241-A-152-A	None
V059	241-A-152-B	241-A-152-B	None
V060	241-A-152-C	241-A-302B/241-A-152-C	None
V061	241-A-152-L16	Capped	None
V100	241-C-151-L1	241-C-153-U9	None
V1000	241-CR-152	244-CR Vault-U14	None
V1001	241-CR-152-U4A	241-CR-153-U3A	None
V1002	241-CR-152-U6A	241-CR-153-U1A	None
V101	241-C-153	Capped	None
V101	241-C-151-L2	241-C-104-04A-U4	None
V102	241-C-101	241-C-151-L4	None
V103	241-C-105	241-C-151-L3	None
V104	241-C-101	241-C-151-L5	None
V105/8636	241-C-151-L6	241-CR-151-U1	None
V107	241-C-252-U4	241-C-151-L8	None
V108/812	241-C-151-U1	244-AR-Tank-002-T9	None
V109	241-C-151-U2	241-A-101	None
V110	241-C-151-U3	244-CR Vault-U12	None
V113	241-C-151	241-AX-101-01A	None
V113	241-C-151	241-AX-103-03A-1	None
V115	241-C-105-05A-U8	241-C-152-L1	None
V118	241-C-152-L4	241-C-153-U6	None
V119	241-C-152-L5	241-C-153-U5	None
V120	241-C-152-L6	241-C-153-U4	None
V121	241-C-152	Capped	None
V122	241-C-105-05A-U4	241-C-152-L8	None
V130	241-B-154-L8	241-C-152-U4	None
V136	241-C-153-L1	None Identified	None
V137	241-C-153-L2	241-C-110	None
V138	241-C-110	241-C-153-L3	None
V139	241-C-110	241-C-153-L4	None
V140	241-C-110	241-C-153-L5	None
V141	241-C-153-L6	Capped	None
V142	241-C-153-L7	Capped	None
V143	241-C-107	241-C-153-L8	None
V144	241-C-107	241-C-153-L9	None
V145	241-C-107	241-C-153-L10	None
V147	241-C-153-L1`2	None Identified	None
V148	241-C-104	241-C-153-L13	None
V149	241-C-104	241-C-153-L14	None
V150	241-C-104	241-C-153-L15	None
V156	241-C-201	241-C-252-L1	None
V157	241-C-201	241-C-252-L2	None
V158	241-C-202	241-C-252-L3	None
V159	241-C-202	241-C-252-L4	None
V160	241-C-203	241-C-252-L5	None
V161	241-C-203	241-C-252-L6	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V162	241-C-204	241-C-252-L7	None
V163	241-C-204	241-C-252-L8	None
V172	241-C-252-U1	241-C-109/241-C-112	None
V175	241-C-252-U5	201-C Hot Semi Works	None
V200	241-B-154-U7	221-B	None
V2000	241-BXR-152-U1A	241-BX-155-L9	None
V2001	241-BX-155-L10	241-BR-152-U1A	None
V201	241-B-154-U8	241-B-302B Catch Tank	None
V203	241-B-154-L2	Crib	None
V204	241-B-154-L3	Sump	None
V208	241-B-154-L7	241-B-152-U6	None
V209	241-B-154-L9	241-B-152-U5	None
V210/V111	241-B-154-L10	241-C-151-U4	None
V211	241-B-154-L11	241-B-152-U4	None
V213	241-B-154-L13	241-B-151-U4	None
V214/8902	241-B-154-L14	221-B	None
V215	241-B-154-L15	241-B-151-U3	None
V219	241-ER-151-L2	Capped	None
V225	241-B-151-U1	241-ER-151-L10	None
V228	241-CR-153-U6A	241-ER-153-7	None
V230	241-B-153-U1	241-B-151-L1	None
V231	241-B-153-U8	241-B-151-L2	None
V233	241-B-151-L4	241-B-101	None
V234	241-B-151-L5	241-B-101	None
V235	241-BX-153-U3	241-B-151-L6	None
V236	241-BX-153-U11	241-B-151-L7	None
V237	241-B-151-L8	241-BX-101	None
V238	241-B-151/B-153/B-252 Drains	241-B-301B Catch Tank	None
V240	241-B-152-U3	241-B-151-U5	None
V242	241-BX-153-U4	241-B-152-L1	None
V243	241-V-252-U6	241-B-152-L2	None
V244	244-CR Vault	241-ER-153	None
V245	241-B-153-U6	241-B-153-L4	None
V246	241-B-153-U5	241-B-152-L5	None
V247	241-B-153-U4	241-B-153-L6	None
V250	241-B-152-L11	241-B-106	None
V252	241-BX-153-U6	241-B-152-L11	None
V253	241-BX-153-U5	241-B-152	None
V260	241-B-153-L2	241-B-111	None
V261	241-B-153-L3	241-B-110	None
V262	241-B-153-L4	241-B-110	None
V263	241-B-153-L5	241-B-110	None
V266	241-B-153-L8	241-B-107	None
V267	241-B-153-L9	241-B-107	None
V268	241-B-153-L10	241-B-107	None
V271	241-B-153-L13	241-B-104	None
V272	241-B-153-L14	241-B-104	None
V273	241-B-153-L15	241-B-104	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V282	241-BX-155-U2	241-BX-154-L3	None
V283	241-BX-155-U3	241-BX-154-L4	None
V284	241-BX-155-U4	241-BX-154-L5	None
V285	241-BX-154-L6	241-B-252-U5	None
V289	241-BX-154-U9	241-BX-302B	None
V290	241-BX-201	241-B-252-L1	None
V291	241-BX-201	241-B-252-L2	None
V292	241-BX-202	241-B-252-L3	None
V293	241-BX-202	241-B-252-L4	None
V294	241-BX-203	241-B-252-L5	None
V295	241-BX-203	241-B-252-L6	None
V296	241-BX-204	241-B-252-L7	None
V297	241-BX-204	241-B-252-L8	None
V305	241-B-252-L16	241-BY-109	None
V307	242-B-151-L1	241-B-108	None
V308	242-B-151-L2	241-B-109	None
V309	242-B-151-L3	241-B-107	None
V310	242-B-151-L4	241-B-105	None
V311	242-B-151-L5	241-B-104	None
V312	241-B-104	241-B-151-Drain	None
V313	242-B-151-U1	242-B Evaporator	None
V314	242-B Evaporator	Cut and Capped	None
V315	241-BX-155-L2	241-B-151-U6	None
V316	241-BX-153-U9	241-BX-155-L3	None
V317	241-BX-153-U8	241-BX-155-L4	None
V318	241-BX-153-U7	241-BX-155-L5	None
V319	241-BX-155-L6	241-B-152-U2	None
V323	241-BX-155-U7	241-BX-302C	None
V329	241-B-154-U1	221-B	None
V330	241-B-154-U2	221-B	None
V331	241-B-154-U3	221-B	None
V332	241-B-154-U4	221-B	None
V333	241-B-154-U5	221-B	None
V334	241-B-154-U6	221-B	None
V335	221-B	241-BX-154-U1	None
V336	241-BX-154-U2	221-B	None
V337	241-BX-154-U3	221-B	None
V338	241-BX-153-U12	241-B-302A	None
V339	241-BX-154-U5	221-B	None
V340	241-BX-154-U6	221-B	None
V341	241-BX-154-U7	221-B	None
V342	241-BX-110	241-BX-153-L4	None
V342	241-BX-154-U8	221-B	None
V343	241-BX-110	241-BX-153-L5	None
V344	241-BX-110	241-BX-153-L6	None
V345	241-BX-109	241-BX-153-L11	None
V346	241-BX-107	241-BX-153-L8	None
V347	241-BX-107	241-BX-153-L9	None
V348	241-BX-107	241-BX-153-L10	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V349	241-BY-104	241-BX-153-L12	None
V350	241-BX-112	241-BX-153-L7	None
V351	241-BX-104	241-BX-153-L13	None
V352	241-BX-104	241-BX-153-L14	None
V353	241-BX-104	241-BX-153-L15	None
V355	241-BX-101	241-BX-153-L17	None
V365	241-ER-151-U8	Flow meter Box	None
V374	241-UX-154-U6*	221-U	None
V375	241-UX-154-U9*	241-TX-155-U17	None
V376	241-UX-154-U10*	241-TX-155-U15	None
V382	241-UX-154-L3*	241-TX-155-U11	None
V383	241-TX-154-L7	Capped	None
V384	241-TX-154-7	Capped	None
V385	241-TX-154-L7	Capped	None
V386	241-TX-155-L8	Capped	None
V388	241-TX-155-U12	Capped	None
V391	241-TX-154-L3	241-TX-155-U16	None
V392	241-TX-154-L2	241-TX-155-U18	None
V393	241-TX-302B	241-TX-155-U19	None
V394	241-TX-155-A1	241-TX-155-A2	None
V395	241-TX-155-B1	241-TX-155-B2	None
V396	241-TX-155-L2	241-TX-153-U15	None
V397	241-TX-155-L4	241-TX-153-U14	None
V399	241-T-152-U7	241-TX-155-U6	None
V401	241-TX-155-L8	241-TX-153-U12	None
V402	3241-TX-155-L9	Capped	None
V403	241-TX-155-L10	241-TX-153-U11	None
V405	241-T-152-U3	241-TX-155-L12	None
V406	241-TX-155-L13	Capped	None
V407	241-TX-155-L14	241-TX-153-U6	None
V487	241-U-201	241-U-252-L1	None
V408	241-TX-155-L15	Capped	None
V408	244-TX-0	241-TX-152 Drain	None
V409	241-TX-155-L16	241-TX-153-U4	None
V410	241-TX-155-L17	Capped	None
V410	241-U-151-U2	241-TX-155-L17	None
V411	241-T-151-U2	241-TX-155-L18	None
V412	241-TX-155-L19	Blocked	None
V413	241-TX-155-L20	241-TX-153-U3	None
V416	241-U-152-U1	241-TX-153-U10	None
V426	241-U-152-L4	241-U-153-U6	None
V427	241-U-152-L5	241-U-153-U5	None
V428/V461	241-U-152-L6	241-U-153-U4	None
V450	241-U-153-U9	241-U-151-L1	None
V445	241-U-151-U1	241-T-151-L6	None
V458	241-U-153-U1	240-S-151-L9	None
V459	241-U-153-U2	240-S-151-L15	None
V460	241-U-153-U3	240-S-151	None
V465	241-U-153-L3	241-U-110	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V466	241-U-153-L4	241-U-110	None
V467	241-U-153-L5	241-U-110	None
V470	241-U-153-L8	241-U-107	None
V471	241-U-153-L9	241-U-107	None
V472	241-U-153-L10	241-U-107	None
V473/5107/5507/5307	241-U-153-L11	241-UR-154-L8/-UR-153-L8/UR-152-L8	None
V488	241-U-201	241-U-252-L2	None
V489	241-U-202	241-U-252-L3	None
V490	241-U-202	241-U-252-L4	None
V491	241-U-203	241-U-252-L5	None
V492	241-U-203	241-U-252-L6	None
V493	241-U-204	241-U-252-L7	None
V494	241-U-204	241-U-252-L8	None
V5006	241-S-104-04A	241-S-107-07A	None
V508	240-S-151-L17	241-S-151-U6	None
V509	240-S-151-L16	241-S-151-U7	None
V512	240-S-151-L13	241-S-151-U10	None
V513	240-S-151-L12	241-S-151-U11	None
V514	240-S-151-L6/241S-151-U12	Capped	None
V515	240-S-151-L9	241-S-151-U14	None
V516	240-S-151-L7	241-S-151-U15	None
V517	240-S-151-L5	Capped	None
V517	241-S-151-U16	REDOX Lab Waste	None
V519	240-S-151-L2	241-S-151-U18	None
V526	241-SX-151-U13	241-S-151-L4	None
V527	241-SX-151-U10	241-S-151-L5	None
V528	241-SX-151-U8	241-S-151-L6	None
V529	241-SX-151-U6	241-S-151-L7	None
V530	241-SX-151-U4	241-S-151-L5	None
V533	241-S-151-L11	Crib	None
V534	241-S-110	241-S-151-L12	None
V535	241-S-110	241-S-151-L13	None
V536	241-S-107	241-S-151-L14	None
V537	241-S-107	241-S-151-L15	None
V538	241-S-104	241-S-151-L16	None
V539	241-S-104	241-S-151-L17	None
V541	241-S-101/101 S Caisson	241-S-151-L19	None
V542	241-S-304	241-S-151	None
V543	241-S-304	241-S-151	None
V544	240-S-151-L1	216-S Swamp	None
V547	240-S-151-L8	216-S Crib	None
V548	240-S-151-L10	V544/216 S Swamp	None
V550	240-S-151	V544/216-S Swamp	None
V552	240-S-151-U3	240-S-152-L2	None
V553	240-S-151-U8	240-S-142-L3	None
V554	240-S-151-L12	241-S-302-CT	None
V555	240-S-152-L1	240-S-151-U17	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V563	241-SX-151-U1	241S-302A	None
V564	241-SX-151-U11	241-SX-151-U2	None
V566	241-SX-151-U9	241-SX-151-U5	None
V567/V581	241-SX-151-U7	241-SX-152	None
V569	241-SX-302-A	241-SX-151-L1	None
V570	241-SX-110	241-SX-151-L2	None
V571	241-SX-111	241-SX-151-L2	None
V572	241-SX-112	241-SX-151-L4	None
V574	241-SX-109	241-SX-151-L6	None
V575	241-SX-108	241-SX-151-L7	None
V576	241-SX-107	241-SX-151-L8	None
V577	241-SX-151-L9	241-SX-152	None
V578	241-SX-101	241-SX-151-L10	None
V579	241-SX-102	241-SX-151-L11	None
V580	241-SX-103-03	241-SX-151-L12	None
V582	241-SX-106	241-SX-151-L14	None
V583	241-SX-105	241-SX-151-L15	None
V584	241-SX-104	241-SX-151-L16	None
V591	241-SX-114	241-SX-151-L23	None
V595	241-SX-302-A	241-SX-152	None
V596	241-TX-153-U1	241-TX-302A	None
V597	241-TY-153-L1	241-TX-153-U2	None
V600	241-TXR-152-U14	241-TXR-153-U14/241-TX-153-U8	None
V6002	241-TR-152-U13	241-T-103-03A-U1	None
V6006	241-TR-152-U12	241-T-102-02A-U1	None
V601	241-T-152-L10	241-TX-153-U9	None
V6010	241-TR-152-L11	241-T-101-01A-U1	None
V603	241-TX-153-A1	241-TX-153-A2	None
V604	241-TX-153-B1	241-TX-153-B2	None
V606	241-TX-153-C2	219-1 Crib	None
V608	241-TX-101	241-TX-153-L2	None
V609	241-TX-101	241-TX-153-L3	None
V610	241-TX-153-L4	242-T Evaporator	None
V612	241-TX-105	241-TX-153-L6	None
V613	241-TX-105	241-TX-153-L7	None
V615	241-TX-115/15-X	241-TX-153-L9	None
V616	241-TX-118	241-TX-153-L10	None
V617	241-TX-107	241-TX-153-L11	None
V618	241-TX-109	241-TX-153-L12	None
V619	241-TX-109	241-TX-153-L13	None
V621	241-TX-113	241-TX-153-L15	None
V622	241-TX-113	241-TX-153-L16	None
V625	241-TX-116	241-TX-153-L19	None
V644	241-TY-103	241-TY-153-L7	None
V645	241-TY-103	241-TY-153-L8	None
V648	241-TY-101	241-TY-153-L11	None
V649	241-TY-101	241-TY-153-L12	None
V653	241-T-151-U3	221-T	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V654	241-T-151-U4	221-T	None
V657	241-T-151-L1	241-T-153-U1	None
V658	241-T-151-L2	241-T-153-U8	None
V660	241-T-101	241-T-151-L4	None
V661	241-T-101	241-T-151-L5	None
V663	241-T-151-L8	Crib	None
V664	241-T-151/241-T-152/241-T-153	241-T-302B	None
V667	241-T-152-U4	221-T	None
V668	241-T-152-U5	221-T	None
V669	241-T-152-U6	221-T	None
V671	241-T-152-U9	224-T	None
V675	241-T-153-U5	241-T-152-U4	None
V676	241-T-153-U6	241-T-152-U5	None
V677	241-T-152-L6	241-T-153-U4	None
V690	241-T-110	241-T-153-L2	None
V691	241-T-110	241-T-153-L4	None
V692	241-T-110	241-T-153-L5	None
V695	241-T-107	241-T-153-L8	None
V696	241-T-107	241-T-153-L9	None
V697	241-T-107	241-T-153-L10	None
V698	241-T-106	241-T-153-L11	None
V699	241-T-105	241-T-153-L12	None
V700	241-T-104	241-T-153-L13	None
V701	241-T-104	241-T-153-L14	None
V702	241-T-104	241-T-153-L15	None
V707	221-T-Section 10	Unknown	None
V711	241-T-201	241-T-252-L1	None
V712	241-T-201	241-T-252-L2	None
V713	241-T-202	241-T-252-L3	None
V714	241-T-202	241-T-252-L4	None
V714	PUREX-F16	241-AR-151-2	None
V715	241-T-203	241-T-252-L5	None
V716	241-T-203	241-T-252-L6	None
V716	241-U-301-B	244-U Vault-E	None
V717	241-T-204	241-T-252-L7	None
V718	241-T-204	241-T-252-L8	None
V718/817	241-AR-151-10	244-AR Vault-T-15	None
V727	241-T-301-B	241-T-252 Drain	None
V730	221-T	241-TX-154-U1	None
V732	221-T	241-TX-154-U2	None
V734	221-T	241-TX-154-U4	None
V735	221-T	241-TX-154-U5	None
V736	241-TX-154-L6	291-5 STACK	None
V737	221-T	241-TX-154-U7	None
V738	221-T	241-TX-154-U8	None
V739	241-TX-154-U9	241-TX-302C Catch Tank	None
V743	221-B	241-C-154	None
V762/4853	241-SX-152	241-UX-154-L9	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V827	241-TX-113	241-T-151-L2	None
V831	241-TX-114/TX-14B Valve Pit	242-T-151-L1	None
V839	241-C-154	201-C Hot Semi Works	None
V843	241-C-102	241-CR-151-L9	None
V844	241-C-102	241-CR-151-L8	None
SL-104	241-A-A	241-A-B	None
SN-216	241-A-B, R-16	244-A, P-9	None
SN-215	241-A-A, L-16	244-A, P-7	None
SN-232	244-A, P-3	241-ER-153, P-3	None
SN-234	244-A, P-2	241-ER-153, P-5	None
F-562	F-562	241-A-417	None
SN-233	244-A, P-4	241-ER-153, 4	None
DR-300	207-A	241-A-350	None
PW-481/SN-234	241-A-350	242-A, 14	None
SL-107	241-A-A	241-A-101-01H	None
F-100	241-A-417, 22	241-AX-501, U-1	None
V028	241-A-151	241-A-302A	None
V027	241-A-151, U-4	241-302-A	None
V023	241-A-151, L-23	241-AW-B, R-11	None
SN-201/214	241-A-A, L-1	241-AX-A, L-1	None
SN-219	241-A-B, R-2	241-AW-B, R-2	None
SN-650	241-A-B, R-15	241-AP-102	None
V022	241-A-151, L-24	241-AW-B, R-12	None
SN-200/213	241-A-B, R-1	241-AX-B, R-1	None
DR-310	241-A-B	241-A-350	None
SN-204	241-A-A, L-19	241-A-B, R-19	None
DR-311	241-A-A	241-A-350, C	None
DR-307	241-A-A/A-B	241-A-350	None
DR-302	241-A-350	COB-A-2	None
4001/T029	241-A-B, R-12	202A, T029	None
4004/6341/4029/V029	241-A-A, L-12	202A	None
D008	241-A-151, U-25	202A	None
D020	241-A-151, U-19	202A	None
D040	241-A-151, U-27	202A	None
D070	241-A-151, U-26	202A	None
D149	241-A-151, U-18	202A	None
D186	241-A-151, U-5	202A	None
E006	241-A-151, U-24	202A	None
E167	241-A-151, U-23	202A	None
F241	241-A-151, U-21	202A	None
F274	241-A-151, U-9	202A	None
F377	241-A-151, U-14	202A	None
F429	241-A-151, U-13	202A	None
F719	241-A-151, U-20	202A	None
F791	241-A-151, U-8	202A	None
G057	241-A-151, U-17	202A	None
G180	241-A-151, U-11	202A	None
M044	241-A-151, U-10	202A	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
M045	241-A-151, U-22	202A	None
R165	241-A-151, U-12	202A	None
R345	241-A-151, U-15	202A	None
U039	241-A-151, U-6	202A	None
U136	241-A-151, U-7	202A	None
V001	241-A-151, U-3	202A	None
V002	241-A-151, U-2	202A	None
V003	241-A-151, U-1	Spare	None
DR-301	241-A-350	Spare	None
4509/4507	241-AX-155, 5	241-AZ-101	None
4512/4600	241-AX-155, 4	241-AZ-102	None
SN-400	241-AX-155, U-3	241-AX-152-B	None
SL-502	241-AX-B, R-16	241-AY-102-02D, U-3	None
SL-108	241-AX-A	241-AX-101-01A	None
SL-110	241-AX-A	241-AX-B	None
SN-247	241-AX-B, R-11	241-AN-01E, A	None
SL-100	241-AX-B	241-A-B	None
SL-500	241-AX-A, L-5	241-AZ-02A, U-10	None
F-101	241-AX-501, L-1	241-AY-501	None
F-102	241-AX-501, L-2	241-AX-152, B	None
DR-325/330/333/347/348	COBS AX-20/24/25	---	None
DR-314/317/320/322/329	COBS AX-19/17/15/11/13	---	None
DR-370	AX Seal Pot	241-AY-102, R-24	None
DR-326/336	AX Seal Pot	241-AX-A/B	None
DR-0030	241-AX-501	241-A-417	None
4505B/B106/B1061	241-AX-152, N-6	241-AY-102	None
4511/B109	241-AX-152, 7	241-AZ-102	None
DR-310/314/315/317/318/321/323	COBS A-10/12	---	None
4508/B105	241-AX-152	241-AZ-101	None
U173	241-AX-155	241-AX-152	None
4503/C108	241-AX-155, N-3	241-AY-101	None
SL-101	241-AX-A	241-A-A	None
SL-109	241-AX-B, R-7	241-AX-02A	None
4001	241-AX-151	Capped	None
4022	241-AX-152-CT	241-AX-151	None
4020	241-AX-151	241-AY-151	None
V-510	241-S-151	241-S-304	None
V-520	241-S-151	244-S	None
V-522	241-S-151	244-S	None
V-542	241-S-151	241-S-304	None
V-560	241-S-151	244-S	None
V-406	244-TX	241-TX-152	None
V-410	241-TX-155	241-U-151	None
TX-151 Drain Line	241-TX-154	241-TX-302C	None
V-408	244-TX	241-TX-152	None
V-402	244-TX	241-TX-152	None
SN-202/203	PFP	244-TX	None
V-387	241-TX-152	241-TX-154	None

Inactive/Not-In-Use Components

Piping Transfer Lines			
Line Number	**Connecting Facility**	**Connecting Facility**	**LDM or BMP**
V-730	241-TX-302C	241-TX-154	None
V422/V452	241-U-151	241-U-152	None
V398	241-U-152	241-TX-152	None
V-404	241-U-152	241-TX-152	None
V421/V453	241-U-151	241-U-152	None
241-U-152 Drain Line	241-U-152	241-U-301B	None
241-U-151 Drain Line	241-U-151	241-U-301B	None
SN-216/282	241-U-D	241-SY-B	None
SL-107	241-U-111	241-U-C	None
V-455	241-U-151	241-S-151	None
V-456	241-U-151	244-S	None
V-473	241-U-301B	241-U-152	None
V-503/4700	241-UX-154	241-S-151	None
V-505/4701	241-UX-154	241-S-151	None
V224	241-ER-311	241-ER-151, U-1	None
V244ER	241-ER-152, 2	241-ER-153, 1	None
SN-9808	241-ER-151, E-5	244BX, N	None
V-228	241-ER-151, U-10	241-ER-153, 2	None
V-229	241-ER-151, U-11	241-ER-152, 3	None
DR311	241-ER-152	241-ER-311	None
V-226	241-ER-151	241-ER-311	None
V-226-1	241-ER-151	241-ER-311	None
241-ER-153 to 244-A Drain Line	241-ER-153	244-A	None
V-361	241-Er-151	241-UX-154	None
V-244CR	241-ER-153, 9	244-CR-3, U-13	None
V-362	241-ER-151	241-UX-154	None
V-363	241-ER-151	241-UX-154	None
V-364	241-ER-151	241-UX-154	None
V-365	241-ER-151	241-UX-154	None

APPENDIX B

RATIONALE AND JUSTIFICATION FOR IMPLEMENTING REQUIREMENTS AND BEST MANAGEMENT PRACTICES

This page intentionally left blank.

CONTENTS

B1.0 INTRODUCTION B-1

B2.0 SINGLE-SHELL TANK SYSTEM LEAK LOSS RISK REDUCTION B-3
- B2.1 LIQUID MINIMIZATION AND CONTROL B-4
- B2.2 CONTAMINATION MIGRATION MITIGATION B-5
- B2.3 OPERATIONAL RISK EVENT MITIGATION B-5
  - B2.3.1 Waste Conditions that Lead to Leaks B-6
  - B2.3.2 Modified Waste Management Practices B-6

B3.0 LEAK DETECTION AND LIQUID INTRUSION MONITORING B-7
- B3.1 LIQUID INTRUSION MONITORING B-7
- B3.2 LEAK DETECTION REQUIREMENTS B-13
- B3.3 SINGLE-SHELL TANKS B-24
- B3.4 MUSTS and VESSELS AND CELLS IN MISCELLANEOUS STRUCTURES B-26

B4.0 REFERENCES B-30

TABLES

Table B-1. Surface Level In-Tank Liquid Detection Instrumentation (6 Sheets) B-7

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets) B-13

Table B-3. Summary of Leak Detection Requirements and Bases (5 Sheets) B-24

Table B-4. Single-Shell Tanks With >40K Drainable Interstitial Liquid and Without Intrusion Prevention B-25

Table B-5. Single-Shell Tanks with Suspect Integrity Requiring Periodic Monitoring B-25

Table B-6. Single-Shell Tanks Requiring Intrusion Monitoring B-26

Table B-7. MUSTs, Vessels, and Cells Requiring Leak Detection Monitoring B-27

Table B-8. MUSTs, Vessels, and Cells Requiring Annual Intrusion Monitoring B-28

Table B-9. MUSTs, Vessels, and Cells that Cannot Be Monitored B-29

This page intentionally left blank.

ABBREVIATIONS AND ACRONYMS

BMP	best management practice
CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
DST	double-shell tank
Ecology	Washington State Department of Ecology
HFFACO	*Hanford Federal Facility Agreement and Consent Order*
LDM	leak detection and monitoring
MUST	miscellaneous underground storage tank
ORP	Office of River Protection
RCRA	*Resource Conservation and Recovery Act of 1976*
SST	single-shell tank
WAC	*Washington Administrative Code*
WMA	waste management area

This page intentionally left blank.

APPENDIX B

RATIONALE AND JUSTIFICATION FOR IMPLEMENTING REQUIREMENTS AND BEST MANAGEMENT PRACTICES

B1.0 INTRODUCTION

This appendix outlines the rationale and justification for the single-shell tank (SST) system leak detection and monitoring (LDM) implementing requirements defined in Section 4.0, "Leak Detection and Monitoring Functions and Requirements," and the non-leak detection monitoring best management practices (BMPs) identified in main text Section 5.0, "Current Single-Shell Tank System Monitoring." The implementing requirements address LDM parameters for SSTs, miscellaneous underground storage tanks, vessels and cells in miscellaneous structures, pits, and piping. The requirements were developed based on regulatory and technical analyses (e.g., limits of LDM technology, operational status of system components). The BMPs were developed based on technical analyses and implementing operational practices that meet the goal of operating the tank farms in a manner that is protective of human health and the environment.

For the past 25 years, the U.S. Department of Energy (DOE) has worked to mitigate risks posed by liquids stored in the Hanford Site SST system. These efforts have included the following:

- Completion of the removal of drainable liquids from the SSTs.
- Ending waste additions to the SSTs in 1980.
- Resolving high-heat and other safety issues that posed risks to the integrity of the tanks.
- Transferring more than 3.1 million gallons of waste from SSTs to safer storage in double-shell tanks (DSTs).
- Isolating tanks from the potential of liquid intrusions from surrounding tank systems (e.g., water lines, pipes) and minimizing infiltration of liquids from the natural environment into the soils surrounding the tanks.

Work to minimize the potential for leak loss has been augmented by efforts to monitor the nature and extent of contamination previously leaked to the environment through drywell monitoring of soil conditions and groundwater monitoring via a network of *Resource Conservation and Recovery Act of 1976* (RCRA) groundwater monitoring wells. The proposed approach to monitoring for future releases from SSTs and associated ancillary equipment has been adopted to fill gaps in the current liquid monitoring system based on the current condition of the SST system and to meet current regulatory requirements identified in the main text, Section 4.0.

This page intentionally left blank.

B2.0 SINGLE-SHELL TANK SYSTEM LEAK LOSS RISK REDUCTION

The risk posed by liquids in the SST system has been, and will continue to be, significantly mitigated. The following sections outline action taken to:

- Minimize and control liquid waste in the SST system,
- Mitigate the potential for contaminant migration from past and future SST system leaks,
- Reduce potential for an operational condition that would result in a leak event, and
- Monitor and detect past and future leaks from the SST system.

The SSTs and their associated ancillary equipment are treatment, storage, and disposal units as defined in "Dangerous Waste Regulations" (*Washington Administrative Code* [WAC] 173-303). The DOE and the Washington State Department of Ecology (Ecology) concur that the SST systems do not have secondary containment and other features required under RCRA and cannot be brought into compliance with WAC 173-303-640. Due to the noncompliance of the SST system tank farms (i.e., tanks and ancillary equipment) are regulated under a Part A interim status permit as defined in WAC 173-303-400 (interim status facility standards). Under Part A regulations, known and suspected releases from 67 of the 149 SSTs have been reported to Ecology and DOE has responded to the reported leak events in accordance with response actions to leaks or spills per WAC 173-303-640. The DOE response actions have been negotiated with Ecology and included in milestones in the *Hanford Federal Facility Agreement and Consent Order* (HFFACO) (Ecology et al. 1989). A response to leaks has not been limited to the 67 assumed leakers. The same response actions have been applied to all 149 SSTs. The following are actions that have been taken to meet those requirements.

- In 1980, DOE completed "cessation of use" of all SSTs (i.e., leakers and nonleakers). Cessation of use included preventing "flow or addition of wastes" to the SST system.
- In 2004, based on consent decree CT-99-5076-EFS, DOE completed removal of "as much of the waste as is necessary to prevent further release of dangerous waste to the environment" (interim stabilization to remove drainable liquids that posed a leak potential and intrusion prevention to limit the potential for new liquids to enter stabilized SSTs) in all single-shell tanks with the exception of 241-S-102 and 241-S-112. 241-S-102 and 241-S-112 interim stabilization is being accomplished through waste retrieval. While WAC 173-303 requires removal of waste from SSTs with leaks, DOE and Ecology agreed that all SSTs would have liquid waste removed to the extent practical and actions would be taken to limit the potential for liquid intrusion into SSTs to mitigate the potential for further releases to the environment.
- The DOE has implemented a RCRA Corrective Action Process, as defined in HFFACO, Section 7.0, to comply with requirements defined in WAC 173-303-640 for investigation of past tank leaks and implementation of corrective measure, where appropriate, to "avoid or limit additional releases, or to control subsurface movement of contaminants to minimize additional insult to human health and the environment from SST waste," including isolating water lines and constructing berms to control storm water runon. The

RCRA Corrective Action Process is addressing past tank leaks and spills from tanks and ancillary equipment in the S, SX, T, TX, TY, B, BX, and BY tank farms.

- The DOE has completed initial interim measures, such as disconnecting waterlines and testing waterlines, placement of berms and run-on controls at all tank farms, and placing leak-tight caps on drywells to "Prevent further migration of the leak or spill to soils or surface water." These initial interim measures are "designed to minimize intrusion and contaminant migration to groundwater" (HFFACO Change Number M-45-98-03).
- The DOE has agreed to a schedule that will result in the "removal of waste from tank system or secondary containment system" as soon as practical (under HFFACO Milestone M-45-00).

B2.1 LIQUID MINIMIZATION AND CONTROL

Interim stabilization and waste retrieval efforts have reduced the risk of liquid releases from SSTs by reducing the volume of drainable liquid waste in the SST system and limiting the potential for liquid intrusions into the SST system. From an estimated inventory of 74 million gallons of waste in SSTs in 1967, the total waste volume stored in the SST system has been reduced to just over 32 million gallons of liquid and solid waste. Interim stabilization and waste retrieval efforts reduced the drainable liquids in SSTs to an estimated 2.88 million gallons.

Interim stabilization refers to the removal and transfer of pumpable liquids (i.e., the supernate plus the amount of interstitial liquid capable of being pumped) from SST system components (i.e., SSTs, miscellaneous underground storage tanks [MUST], and ancillary tanks) to DSTs. An SST is considered interim stabilized if it contains less than 50,000 gallons of drainable interstitial liquids and less than 5,000 gallons of supernate. A MUST or ancillary tank is considered stabilized if it contains less than 400 gallons of liquids or less than 5,000 gallons of supernate that cannot be transferred by tanker truck (TFC-ENG-CHEM-P-15).

The interim stabilization program for Hanford Site SSTs began with the pumping of Tank BY-107 that achieved interim stabilization in August 1979. Tanks A-104, BX-101, and SX-115 were the first SSTs to be declared interim stabilized in September 1978 (WHC-EP-0182, Rev. 79). Each month, a waste tank summary report is issued that declares the current status of all waste tanks.

Single-shell tank interim stabilization milestones were renegotiated in 1999 and were identified in a Consent Decree (CT-99-5076-EFS) between the State of Washington, Ecology, and the DOE, dated August 16, 1999. According to the Consent Decree, all interim stabilization activities for SSTs were completed by September 30, 2004. The interim stabilization for 241-S-112 occurred during waste retrieval of the tank; the interim stabilization of 241-S-102 has been deferred and will occur during waste retrieval of the tank.With the deferral of the interim stabilization of 241-S-102 and 241-S-112 to the waste retrieval period for each tank, pursuant to the Consent Decree, Interim Stabilization has been completed.

Since 1980, DOE has prohibited the intentional addition of new liquid wastes to the SST system. The DOE has also implemented intrusion prevention actions to limit the potential for intrusion of liquids into the interim stabilized tanks. Intrusion prevention is accomplished in accordance with TFC-ENG-FACSUP-P-03.

Of the seventeen SST system MUSTs, eight have been interim stabilized or meet interim stabilization criteria.

B2.2 CONTAMINATION MIGRATION MITIGATION

The risk of released contamination migrating in the soils surrounding SSTs to groundwater has been reduced, limiting the potential of environmental and human health consequences from past and future leak events. Past leaks from approximately 67 tanks have resulted in about 1 million gallons of released waste within the tank farms. Recent analysis in support of the waste management area (WMA) S-SX field investigation report has demonstrated that migration of tank leaks has been enhanced by tank farm operations and physical conditions (RPP-7884). To address this condition, initial interim measures have been adopted by the Office of River Protection (ORP) to limit migration of past tank releases. These same initial interim measures would limit the potential migration of future release from the tanks during waste storage and management. Initial interim measures are mitigating measures that can be performed without the need of a formal regulatory process. The Tank Farm Vadose Zone Project has performed the following initial interim measures.

- Leak-tight capping of boreholes. Because boreholes are in active WMAs, their caps often break because of accidents. All borehole caps were replaced in 1999.
- Cutting off waterlines and leak testing mission essential waterlines. Leaking waterlines can have a major impact on the transport of contaminants from past tank leaks and spills in the tank farms (RPP-7884). All waterlines going to the SST farms have been classified based on their potential future use. All unnecessary waterlines in the 200 East and West Areas have been cut and capped outside of the tank farm fence lines.
- Constructing upgradient run-on controls for the tank farms. There have been many instances when ponds of water have been standing in the tank farms. This has been caused by water running onto the tank farms following rapid snowmelts and other events. Barriers (essentially berms) have been constructed around the SST farms where the natural topography does not provide a barrier to water run-on.

B2.3 OPERATIONAL RISK EVENT MITIGATION

The probability of a new leak loss event during tank farm operations has been mitigated. The following sections outline actions that have been taken to mitigate the potential for a new tank leak resulting from waste operating and management practices.

B2.3.1 Waste Conditions that Lead to Leaks

Storage of high-heat waste in aging SSTs was among the operating and management practices that contributed to the occurrence of tank leaks. For example, in the 1950s and 1960s five tanks experienced bulged bottoms attributable to expansion and compromise of the steel liner bottom resulting from the addition of boiling wastes to the tanks. One additional tank also experienced a bulge from unknown causes. A cesium and strontium capsule program removed heat-generating cesium and strontium from the tank waste for safer storage. Excessive heat in the tanks has been associated with five SSTs experiencing bulging bottoms resulting in leaks. The waste in the capsule program was either retrieved from tanks or extracted from the waste at the processing facilities enroute to the tanks. The majority of the strontium was removed from tank waste sludges in eight tanks in the A and AX tank farms. Cesium, which is relatively soluble in the waste liquid, was recovered from numerous tanks. Removing the cesium and strontium reduced the heat generation in the tanks and provided for safer storage of the remaining waste. The cesium and strontium were converted to chloride and fluoride salts, respectively, and encapsulated for storage. The retrieval and processing activities started in 1967 and lasted until 1985.

Radioactive decay of the high-level radioactive waste sludge in Tank C-106 resulted in excessive heat buildup. Beginning in mid-1971, water was added periodically to keep the sludge wet and to reduce the heat by evaporative cooling. This continuous addition of water raised concerns that the old SST could leak radioactive waste into the underlying soil. Waste retrieval has been completed in C-106 and evaluation of final status is in progress.

Through the late 1980s and early 1990s, there was widespread concern surrounding the safety of SSTs. A tank Watch List was created in response to a 1990 public law known as the Wyden Amendment (Public Law 101-510, Section 3137 [1990]). The list represented those tanks that may have serious potential for release of radioactive waste to the environment because of increases in temperature or pressure. The safety issues were resolved and the last of the 54 Watch List tanks were removed from the list in 2001, mitigating the potential for accident conditions that could result in a leak loss event.

B2.3.2 Modified Waste Management Practices

The ORP has improved Hanford Site tank farm waste transfer systems to minimize the potential for leak losses during waste transfer operations. Among the improvements: construction of a modern, cross-site transfer line that complies with current regulations and is capable of transferring waste from the 200 West Area to the 200 East Area and eventual waste treatment and immobilization. The new transfer lines replaced six transfer lines that were 45 years old and single-walled. At least four of the six old transfer lines had either plugged or leaked over the years. The ORP also has relied on modern aboveground, temporary, hose-in-hose transfer lines to transfer waste from SSTs to DSTs during interim stabilization processes. Use of the hose-in-hose transfer lines limits use of aged underground pipes (many of which have leaked or are not double-walled) and hence reduces the likelihood to leak waste to the environment when carrying liquid waste.

B3.0 LEAK DETECTION AND LIQUID INTRUSION MONITORING

Single-shell tanks are subject to leak detection and liquid intrusion monitoring as described in this section. The basis for requirements for LDM for SST components is provided in this section.

B3.1 LIQUID INTRUSION MONITORING

Intrusions are detected using the same devices and instruments used for detecting leaks. However, with intrusions the system is set up to detect liquid level increases rather than decreases. The only difference between leak detection and liquid intrusion detection is that the surface level device can always be used for intrusion detection, even on a dry surface. While the dry surface will not decrease in response to a leak, it will register an increase if a large enough intrusion occurs. Once a liquid surface is re-established, the gauge will show a continued increase, and the intrusion will be detected. Table B-1 shows all surface level equipment installed and the comments indicate which gauges are currently used for intrusion detection only.

Table B-1. Surface Level In-Tank Liquid Detection Instrumentation (6 Sheets)

Tank	Surface Level Gauge	LOW Installed?	Comments
A-101	E	Yes	LOW used for intrusion only
A-102	E	--	ENRAF™ used for intrusion only
A-103	E	Yes	LOW used for LDM
A-104	E	--	ENRAF™ used for intrusion only
A-105	E	--	ENRAF™ used for intrusion only
A-106	E	Yes	LOW used for intrusion only
AX-101	E	Yes	LOW used for intrusion only
AX-102	E	--	ENRAF™ used for intrusion only
AX-103	E	Yes	ENRAF™ used for intrusion only
AX-104	E	--	ENRAF™ used for intrusion only
B-101	E	Yes	LOW used for intrusion only
B-102	E	--	ENRAF™ used for intrusion only
B-103	E	--	ENRAF™ used for intrusion only
B-104	E	Yes	LOW used for intrusion only
B-105	E	Yes	LOW used for intrusion only
B-106	E	--	ENRAF™ used for intrusion only
B-107	E	Yes	LOW used for intrusion only
B-108	E	Yes	LOW used for intrusion only
B-109	E	Yes	LOW used for intrusion only

Table B-1. Surface Level In-Tank Liquid Detection Instrumentation (6 Sheets)

Tank	Surface Level Gauge	LOW Installed?	Comments
B-110	E	Yes	LOW used for intrusion only
B-111	E	Yes	LOW used for intrusion only
B-112	E	--	ENRAF™ used for intrusion only
B-201	E	--	ENRAF™ used for intrusion only
B-202	E	--	ENRAF™ used for intrusion only
B-203	E	--	ENRAF™ used for intrusion only
B-204	E	--	ENRAF™ used for intrusion only
BX-101	E	--	ENRAF™ used for intrusion only
BX-102	E	--	ENRAF™ used for intrusion only
BX-103	E	--	ENRAF™ used for LDM
BX-104	E	--	ENRAF™ used for intrusion only
BX-105	E	--	ENRAF™ used for intrusion only
BX-106	E	--	ENRAF™ used for intrusion only
BX-107	E	--	ENRAF™ used for intrusion only
BX-108	E	--	ENRAF™ used for intrusion only
BX-109	E	Yes	LOW used for intrusion only
BX-110	E	Yes	LOW used for intrusion only
BX-111	E	Yes	LOW used for intrusion only
BX-112	E	--	ENRAF™ used for intrusion only
BY-101	MT	Yes	LOW used for intrusion only
BY-102	E	Yes	LOW used for intrusion only
BY-103	E	Yes	LOW used for LDM
BY-104	MT	Yes	LOW used for intrusion only
BY-105	MT	Yes	LOW used for intrusion only
BY-106	--	Yes	LOW used for intrusion only
BY-107	MT	Yes	LOW used for intrusion only
BY-108	MT	Yes	LOW used for intrusion only.
BY-109	E	Yes	LOW used for intrusion only
BY-110	E	Yes	LOW used for intrusion only
BY-111	E	Yes	LOW used for intrusion only
BY-112	MT	Yes	LOW used for intrusion only
C-101	E	--	ENRAF™ used for intrusion only
C-102	--	--	ENRAF™ used for intrusion only
C-103	E	--	Waste retrieval has been completed. ENRAF™ used for intrusion only

Table B-1. Surface Level In-Tank Liquid Detection Instrumentation (6 Sheets)

Tank	Surface Level Gauge	LOW Installed?	Comments
C-104	E	--	ENRAF™ used for intrusion only
C-105	E	--	ENRAF™ used for intrusion only
C-106	E	--	ENRAF™ used for intrusion only. Waste retrieval has been completed
C-107	E	--	ENRAF™ used for intrusion only
C-108	E	--	ENRAF™ used for intrusion only
C-109	E	--	ENRAF™ used for intrusion only
C-110	E	--	ENRAF™ used for intrusion only.
C-111	E	--	ENRAF used for intrusion only
C-112	E	--	ENRAF™ used for intrusion only
C-201	E	--	Waste retrieval has been completed. ENRAF used for intrusion only
C-202	E	--	Waste retrieval has been completed. ENRAF™ used for intrusion only
C-203	E	--	Waste retrieval has been completed. ENRAF™ used for intrusion only
C-204	E	--	Waste retrieval has been completed. ENRAF used for intrusion only
S-101	E	Yes	LOW used for intrusion only
S-102	E	Yes	LOW is not accessible due to retrieval activity. ENRAF installed in stilling well for monitoring.
S-103	E	Yes	LOW used for intrusion only
S-104	E	Yes	LOW used for intrusion only
S-105	E	Yes	LOW used for intrusion only
S-106	E	Yes	LOW used for intrusion only
S-107	E	Yes	LOW used for intrusion only
S-108	E	Yes	LOW used for intrusion only
S-109	E	Yes	LOW used for intrusion only
S-110	E	Yes	LOW used for intrusion only
S-111	E	Yes	LOW used for intrusion only
S-112	E	--	Waste retrieval in progress
SX-101	E	Yes	LOW used for intrusion only
SX-102	E	Yes	LOW used for intrusion only.
SX-103	E	Yes	LOW used for intrusion only
SX-104	E	Yes	LOW used for intrusion only
SX-105	E	Yes	LOW used for intrusion only

Table B-1. Surface Level In-Tank Liquid Detection Instrumentation (6 Sheets)

Tank	Surface Level Gauge	LOW Installed?	Comments
SX-106	E	Yes	LOW used for intrusion only
SX-107	E	--	ENRAF™ used for intrusion only
SX-108	E	--	ENRAF™ used for intrusion only
SX-109	E	--	ENRAF™ used for intrusion only
SX-110	E	--	ENRAF™ used for intrusion only
SX-111	E	Yes	LOW used for intrusion only
SX-112	E	Yes	LOW used for intrusion only
SX-113	E	--	ENRAF™ used for intrusion only
SX-114	E	--	ENRAF™ used for intrusion only
SX-115	E	--	ENRAF™ used for intrusion only
T-101	E	Yes	LOW used for intrusion only
T-102	E	--	ENRAF™ used for LDM
T-103	E	--	ENRAF™ used for intrusion only
T-104	E	Yes	LOW used for intrusion only
T-105	E	--	ENRAF™ used for intrusion only
T-106	E	--	ENRAF™ used for intrusion only
T-107	E	--	ENRAF™ used for intrusion only
T-108	E	--	ENRAF™ used for intrusion only
T-109	E	Yes	LOW used for intrusion only
T-110	E	Yes	LOW used for intrusion only
T-111	E	Yes	LOW used for intrusion only
T-112	E	--	ENRAF™ used for LDM
T-201	E	--	ENRAF™ used for intrusion only
T-202	E	--	ENRAF™ used for intrusion only
T-203	E	--	ENRAF™ used for intrusion only
T-204	E	--	ENRAF™ used for intrusion only
TX-101	E	--	ENRAF™ used for intrusion only
TX-102	E	Yes	LOW used for intrusion only
TX-103	E	Yes	LOW used for intrusion only
TX-104	E	Yes	LOW used for intrusion only
TX-105	E	Yes	LOW used for intrusion only
TX-106	E	Yes	LOW used for intrusion only
TX-107	E	--	ENRAF™ used for intrusion only
TX-108	E	Yes	Interstitial Liquid Level (ILL) to low for LOW use, ENRAF™ used for intrusion only

Table B-1. Surface Level In-Tank Liquid Detection Instrumentation (6 Sheets)

Tank	Surface Level Gauge	LOW Installed?	Comments
TX-109	E	Yes	LOW used for intrusion only
TX-110	E	Yes	LOW used for intrusion only
TX-111	E	Yes	LOW used for intrusion only
TX-112	E	Yes	LOW used for intrusion only
TX-113	E	Yes	LOW used for intrusion only
TX-114	E	Yes	LOW used for intrusion only
TX-115	E	Yes	LOW used for intrusion only
TX-116	E	Yes	LOW used for intrusion only
TX-117	E	Yes	LOW used for intrusion only
TX-118	E	Yes	LOW used for intrusion only
TY-101	E	--	ENRAF™ used for intrusion only
TY-102	E	--	ENRAF™ used for intrusion only
TY-103	E	Yes	LOW used for intrusion only
TY-104	E	--	ENRAF™ used for intrusion only
TY-105	E	Yes	LOW used for intrusion only
TY-106	E	--	ENRAF™ used for intrusion only
U-101	E	--	ENRAF™ used for intrusion only
U-102	E	Yes	LOW used for intrusion only
U-103	E	Yes	LOW used for intrusion only
U-104	E	--	MT used for intrusion only
U-105	E	Yes	LOW used for intrusion only
U-106	E	Yes	LOW used for intrusion only
U-107	E	Yes	LOW used for intrusion only
U-108	E	Yes	LOW used for intrusion only
U-109	E	Yes	LOW used for intrusion only
U-110	E	Yes	LOW used for intrusion only
U-111	E	Yes	LOW used for intrusion only
U-112	MT	--	MT used for intrusion only
U-201	MT	--	MT used for intrusion only
U-202	MT	--	MT used for intrusion only
U-203	E	--	ENRAF™ used for intrusion only
U-204	E	--	ENRAF™ used for intrusion only

Table B-1. Surface Level In-Tank Liquid Detection Instrumentation (6 Sheets)

Tank	Surface Level Gauge	LOW Installed?	Comments

Adapted from RPP-9645, Rev. 0.

Level Gauge

E = ENRAF™ Gauge[1]

MT = Manual Tape

LOW = liquid observation well

[1]ENRAF is a trademark of the ENRAF Corporation, Houston, Texas.

B3.2 LEAK DETECTION REQUIREMENTS

As indicated in Section 4.0 of the main text, the SST system structures have been grouped according to their functional uses as either containment structures or transfer components. Containment structures include SSTs, MUSTs, and vessels and cells in miscellaneous structures. The following sections discuss the leak detection and liquid intrusion monitoring based on the requirements identified in the main text in Section 4.0 and the BMPs identified in the main text in Section 5.0. Transfer components include pipes and pits. Table B-2 summarizes the requirements identified in Section 4.0 and the associated rational for the implementation of the requirements.

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
4.1.1(A)(1)	SSTs that are not technically feasible to LDM (i.e., a dry waste surface, and less than 24 inches of drainable liquid in the tank bottom) or waste retrieval, as agreed to by Ecology and the Office of River Protection, has been completed, **shall not require LDM** (see Section 5.0 of the main text for BMP monitoring for these tanks). SSTs that are not technically feasible to LDM and have suspect integrity or SSTs where LDM is technically feasible, meet interim stabilization criteria, intrusion prevention has been completed, and have suspect integrity are required to have **annual periodic monitoring as a BMP**.	Currently available technology cannot directly monitor in-tank liquid levels in a tank with a dry waste surface containing less than 24 inches of drainable liquid in the tank bottom (RPP-9645, Rev. 0).
4.1.1(A)(2)	SSTs that are not technically feasible to LDM and do not have suspect integrity or SSTs where LDM is technically feasible, that meet interim stabilization criteria, intrusion prevention has been completed, and do not have suspect integrity shall have a reduced monitoring frequency due to reduced risk. These tanks are required to have **annual intrusion monitoring as a BMP** (see Section 5.0 of the main text for BMP monitoring for these tanks).	The primary response to a leak in an SST is to respond immediately to remove pumpable liquid. Interim stabilization process typically removed liquid waste until the retrieval rate drops to 0.05 gpm or less if jet pumping is used. At this point, capillary action prevents most of the remaining liquid from draining from the tank solids. Therefore, interim stabilization has already removed liquids to the extent practical. If a leak occurred in an SST meeting interim stabilization criteria, the leak would likely occur at a very low rate thus minimizing the extent of the leak. The low leak rate would also make detecting the leak difficult. Moreover, if a leak occurred and it was detected, additional pumping would not result in the removal of liquid beyond established practical limits in SSTs.

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
4.1.1(A)(3)	SSTs where LDM is technically feasible that do not meet interim stabilization criteria do not have suspect integrity, and have intrusion prevention completed **shall be monitored quarterly**. SSTs that meet the interim stabilization criteria with drainable interstitial liquid >40K gallons and intrusion prevention activity has been completed **shall require quarterly LDM**. SSTs that do not meet these criteria **shall be monitored weekly**. Tanks in which intrusion is detected **shall be monitored weekly**. The cause of the intrusion will be determined and action taken to stop the intrusion. Liquid from intrusion will be removed during the waste retrieval of the effected tank.	Tanks that do not meet interim stabilization criteria require direct measurement of the liquid level for leak monitoring in accordance with WAC 173-303-400 and 40 CFR 265.193. Tanks that are not protected from intrusion must be monitored.
4.1.1(B)(1)	Inactive/not-in-use MUSTs that have been interim stabilized or meet interim stabilization criteria, **shall not require LDM**. MUSTs that are physically isolated are required to have **annual intrusion monitoring as a BMP** and MUSTs that are not physically isolated are required to have **annual periodic monitoring as a BMP** (see Section 5.0 of the main text for BMP monitoring for these tanks).	A response to a leak in an interim stabilized MUST, or MUST containing less than 400 gallons of drainable liquid, could only involve the installation and operation of the emergency pumping system. The MUST liquid levels would not cover the pump inlet, or the pump could not recover liquid from these MUSTs. Therefore, these MUSTs do not require liquid level monitoring. Eight of seventeen inactive/not-in-use MUSTs have been interim stabilized or meet the interim stabilization criteria. Miscellaneous underground storage tanks have been interim stabilized or meet the interim stabilization criteria and are physically isolated.
4.1.1(B)(2)	Inactive/not-in-use MUSTs that have not been interim stabilized and do not meet interim stabilization criteria **shall require LDM.** Mission essential MUSTs **shall require LDM**. LDM systems shall have the ability to detect leaks at the earliest practicable time allowed by existing detection technology and existing tank conditions.	WAC 173-303-400; 40 CFR 265.193(c)(3). Nine MUSTs have not been interim stabilized or do not meet the interim stabilization criteria and have a known volume of drainable liquid. Zero MUSTs are mission essential.
4.1.1(B)(3)	Inactive/not-in-use MUSTs with an indeterminate volume of drainable liquid waste shall have a liquid volume assessment.	Inactive/not-in-use MUSTs with indeterminate liquid waste volumes require assessments to determine if they meet interim stabilization criteria. Based on those assessments, the requirements appropriate to their classification will be imposed.

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
4.1.1(C)(1)	Vessels and cells in miscellaneous structure that are empty and inactive/not-in-use vessels and cells in miscellaneous structures that meet interim stabilization criteria **shall not require LDM**.	The inactive/not-in-use vessels and cells in miscellaneous structures do not and will not receive waste. These vessels and cells have been retrieved to the extent possible, or contain less liquid waste than currently retrievable. Leak detection is therefore not required.
4.1.1(C)(2)	Inactive/not-in-use vessels and cells in miscellaneous structures that do not meet interim stabilization criteria **require LDM**. Mission essential vessels and cells in miscellaneous structures **require LDM**. LDM systems shall have the ability to detect leaks at the earliest practicable time allowed by existing detection technology and existing tank conditions.	WAC 173-303-400; 40 CFR 265.193(c)(3).
4.1.1(C)(3)	Inactive/not-in-use vessels and cells in miscellaneous structures with an indeterminate volume of drainable liquid waste shall have a liquid volume assessment.	Inactive/not-in-use vessels and cells in miscellaneous structures with indeterminate liquid waste volumes require a liquid volume assessment to determine if they meet interim stabilization criteria because then contain less than 400 gallons of liquid waste. Based on those assessments, the requirements appropriate to their classification will be imposed.
4.1.2(A)	All SSTs shall have a tank integrity assessment by an independent, qualified, registered professional engineer in accordance with WAC 173-303-400 and 40 CFR 265.193(i)(2) as implemented by the requirements established in HFFACO Milestone M-23-24. SSTs shall not require secondary containment.	WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to retrieval of the waste in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment in the implementing requirement.
4.1.2(B)(1)	All mission essential MUSTs shall have a tank integrity assessment by an independent, qualified, registered professional engineer in accordance with WAC 173-303-400 and 40 CFR 265.193(i)(2) as implemented by the requirements established in HFFACO Milestone M-23-24. MUSTs shall not require secondary containment.	WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to retrieval of the waste in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment described in the implementing requirement. Currently, the SST system contains no mission essential

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
		MUSTs.
4.1.2(B)(2)	Inactive/not-in-use MUSTs shall not require secondary containment as specified by WAC 173-303-400 and 40 CFR 265.193.	WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to retrieval of the waste in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment in the implementing requirement. Inactive/not-in-use MUSTS will not have secondary containment or integrity examinations for the following reasons: First, inactive/not-in-use MUSTs do not and will not receive waste. Second, the DOE already has plans to retrieve and close the tanks in accordance with the SST System Closure Work Plan (DOE/RL-89-16, Rev. 1). And third, significant technical and cost considerations preclude providing secondary containment or integrity examinations.
4.1.2(C)(1)	Mission essential vessels and cells in miscellaneous structures shall not require secondary containment. Mission essential vessels and cells in miscellaneous structures shall have a tank integrity assessment performed by an independent, qualified, registered professional engineer in accordance with WAC 173-303-400 and 40 CFR 265.193(i)(2) as implemented by the requirements established in HFFACO Milestone M-23-24.	WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to retrieval of the waste in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment described in the implementing requirement. Currently, the SST system contains no mission essential vessels or cells in miscellaneous structures.

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
4.1.2(C)(2)	Inactive/not-in-use vessels and cells in miscellaneous structures shall not require secondary containment as specified by WAC 173-303-400 and 40 CFR 265.193.	WAC 173-303-400 and 40 CFR 265.193 require secondary containment for all existing tanks. The SST system was built prior to RCRA and does not have secondary containment. Technical and cost issues make it unfeasible to provide SST system components with secondary containment. In response to this condition, the DOE committed to retrieval of the waste in accordance with the HFFACO Milestone M-45-00, and HFFACO Milestone M-23-24 required the integrity assessment in the implementing requirement. Inactive/not-in-use vessels and cells in miscellaneous structures will not have secondary containment or integrity examinations for the following reasons. First, inactive vessels and cells in miscellaneous structures do not, and will not, receive waste. Second, vessels and cells in miscellaneous structures have been, or will be, placed in safe standby waiting decommissioning and closure. And third, significant technical and cost considerations preclude providing secondary containment or integrity examinations.
4.1.3(A)(1)	SSTs with a dry waste surface, and less than 24 inches of drainable liquid in the tank bottom shall not require responses to leaks (see Section 5.0 of the main text for BMP monitoring for these tanks).	Currently available technology cannot directly monitor in-tank liquid levels in a tank with a dry waste surface containing less than 24 inches of drainable liquid in the tank bottom (RPP-9645, Rev. 0). The inability to directly monitor in-tank liquid levels precludes effective leak detection and leak response.
4.1.3(A)(2)	SSTs that meet interim stabilization criteria shall not require responses to leaks (see Section 5.0 of the main text for BMP monitoring for these tanks).	Currently developed or available technologies do not exist for removing additional liquid from a leaking tank meeting interim stabilization criteria, other than total waste retrieval already addressed in the HFFACO M-45 milestones. The interim stabilization criteria acknowledge the limitations of further liquid removal from SSTs. Accordingly, no effective response exists for responding to a leak in an SST meeting interim stabilization.

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
4.1.3(A)(3)	SSTs that do not meet interim stabilization criteria require the following responses to leaks: (a) Remove the tank from service; (b) Immediately contain and inspect visible releases to the environment from tank systems; (c) Report leaks to Ecology within 24 hours of their detection unless the hazardous waste leak or spill involves one pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.	WAC 173-303-400 and 40 CFR 265.196; Tanks that do not meet interim stabilization criteria require installation and operation of an emergency pumping system as soon as practicable upon detecting a leak.
4.1.3(B)(1)	Inactive/not-in-use MUSTs that have been interim stabilized or meet interim stabilization criteria shall not require responses to leaks (see Section 5.0 of the main text for BMP monitoring for these tanks).	A response to a leak in an interim stabilized MUST, or a MUST containing less than 400 gallons of drainable liquid could only involve the installation and operation of the emergency pumping system. Tank liquid levels would not cover the pump inlet, or the pump could not recover liquid from these tanks. Eight inactive/not-in-use MUSTs in the SST system have been interim stabilized or contain less than 400 gallons of drainable liquid.
4.1.3(B)(2)	Inactive/not-in-use MUSTs that have not been interim stabilized and do not meet interim stabilization criteria require responses to leaks. Mission essential MUSTs require responses to leaks. The response to a leak will: (a) Remove the tank from service; (b) Remove pumpable liquid from the tank at the earliest practicable time; (c) Immediately contain and inspect visible releases to the environment from tank systems; (d) Report leaks to Ecology within 24 hours of their detection unless the hazardous waste leak or spill involves one pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.	WAC 173-303-400; 40 CFR 265.196(a) through (d)
4.1.3(C)(1)	Inactive/not-in-use vessels and cells in miscellaneous structures that meet interim stabilization criteria shall not require responses to leaks.	The inactive/not-in-use vessels and cells in miscellaneous structures do not and will not receive waste, and have been or will be placed in safe standby awaiting decommissioning and closure. These vessels and cells only contain volumes of drainable liquids at or below the limits that can be practically retrieved by existing tank farm pumping systems (i.e., 400 gallons).

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
4.1.3(C)(2)	Inactive/not-in-use vessels and cells in miscellaneous structures that do not meet interim stabilization criteria shall require responses to leaks. Mission essential vessels and cells in miscellaneous structures shall require responses to leaks. The response to a leak will: (a) remove the system from service; (b) Remove pumpable liquid from the system at the earliest practicable time; (c) Immediately contain and inspect visible releases to the environment from tank systems; (d) Report leaks to Ecology within 24 hours of their detection unless the hazardous waste leak or spill involves one pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.	WAC 173-303-400; 40 CFR 265.196(a) through (d).
4.2.1(A)(1)	Inactive/not-in-use at-tank and between-tank pits **shall not require LDM.**	At-tank and between-tank pits provide secondary containment for transfer systems contained within the pits and are designed to drain liquids to tanks. Transfer system components that are inactive/not-in-use have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. If not in use, the inactive/not-in-use transfer system cannot receive or otherwise transfer waste; therefore, the inactive/not-in-use pits have no opportunity to receive leakage from these unused transfer system components.
4.2.1(A)(2)	When in-use, mission essential at-tank and between-tank pits shall have systems capable of detecting failures of the primary containment structure within 24 hours or at the earliest practicable time if existing detection technology or site conditions will not allow detection of a release within 24 hours.	WAC 173-303-400; 40 CFR 265.193(c)(3)
4.2.2(A)(1)	Inactive/not-in-use at-tank and between-tank pits shall not require secondary containment.	At-tank and between-tank pits provide secondary containment for transfer systems contained within the pits and are designed to drain liquids to tanks. Transfer systems that are inactive/not-in-use have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. If not in use, the transfer system cannot receive or otherwise transfer waste. The inactive/not-

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
		in-use pits have no opportunity to contain leakage from these unused transfer system components. Therefore, application of the requirement for secondary containment is not appropriate based on current and future system configuration.
4.2.2(A)(2)	When in-use, mission essential at-tank and between-tank pits serve as secondary containment and will have direct, in-tank liquid level sensing instruments to detect and prevent any migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time while in use. In-use, mission essential at-tank and between-tank pits will have the ability to collect, contain or drain releases that drain to them until removal of the collected material.	WAC 173-303-400; 40 CFR 265.193(a), (b), and (e)
4.2.3(A)(1)	Inactive/not-in-use at-tank and between-tank pits shall not require responses to leaks.	At-tank and between-tank pits provide secondary containment for transfer systems contained within the pits and are designed to drain liquids to tanks. Inactive/not-in-use pits have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. While inactive/not-in-use, the transfer systems cannot receive or otherwise transfer waste; therefore, the inactive/not-in-use pits have no opportunity to contain leakage from these unused transfer system components. Therefore, application of the requirement for responses to leaks is not appropriate based on current and future system configuration.
4.2.3(A)(2)	When in-use, mission essential at-tank and between-tank pits serve as secondary containment for waste transfers, and will have direct, in-pit liquid level monitoring instruments to detect and prevent migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time while in use. When in use, mission essential at-tank and between-tank pits will have the ability to collect, contain or drain releases that drain to them until removal of the collected material.	WAC 173-303-400; 40 CFR 265.196(a), (b) and (e)

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
4.2.4(A)(1)	Inactive/not-in-use piping **shall not require LDM.**	Transfer systems that are inactive/not-in-use have been or will be physically or administratively isolated from the mission essential transfer systems in accordance with the tank farm procedures. While inactive/not-in-use, the transfer system cannot receive or otherwise transfer waste. Therefore, application of the requirement for LDM is not appropriate based on current and future system configuration.
4.2.4(A)(2)	When in use, mission essential piping shall have systems in the pits at each end capable of detecting failures of the transfer system within 24 hours or at the earliest practicable time if existing detection technology or site conditions will not allow detection of a release within 24 hours.	WAC 173-303-400; 40 CFR 265.193(c)(3)
4.2.5(A)(1)	Inactive/not-in-use piping shall not require secondary containment.	The SST system piping design and constructed prior to RCRA does not have compliant secondary containment (other than when it passes through pits). Transfer systems that are not in use have been or will be physically or administratively isolated from the mission essential waste transfer systems in accordance with the tank farm procedures. While inactive/not-in-use, the transfer system cannot receive or otherwise transfer waste. Therefore, application of the requirement for secondary containment is not appropriate based on current and future system configuration.
4.2.5(A)(2)	When in use, mission essential piping shall have either: (a) Secondary containment designed, installed, and operated to prevent any migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use, ***OR*** (b) Pressure testing prior to first use and at least annually thereafter while in use.	WAC 173-303-400; 40 CFR 265.193(a); 40 CFR 265.193(i)(2)
4.2.6(A)(1)	Inactive/not-in-use piping shall be isolated from in-use transfer systems.	Transfer piping that is inactive/not-in-use must be physically or administratively isolated from in-use transfer systems (tank farm procedures).
4.2.6(A)(2)	Mission essential piping that leaks requires the following response: (a) Cease waste transfers and remove the leaking section of piping from service; (b) Remove pumpable liquid at the earliest practicable time; (c) Immediately contain and inspect visible releases to the environment (pit leak detection on double-encased transfer lines	WAC 173-303-400; 40 CFR 265.196(a) through (e)

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
	satisfies this requirement); (d) Report leaks to Ecology within 24 hours of their detection unless the hazardous waste leak or spill involves one pound or less of material immediately contained and cleaned up; and (e) File a report with Ecology within 30 days.	
4.3.1(A)(1)	Perform integrity assessment, and maintain associated documents, in accordance with M-23-24.	HFFACO M-23-24.
4.3.1(A)(2)	Retrieve SST system waste in accordance with HFFACO Milestone M-45-00.	HFFACO Milestone M-45-00.
4.3.2(A)	All SSTs shall receive a **daily or weekly** inspection in accordance with tank farm procedures	Tank farm procedures.
4.3.2(B)(1)	inactive/not-in-use MUSTs **shall not require daily inspections.**	Inactive MUSTs do not and will not receive waste. These tanks have been removed from service. Therefore, inactive/not-in-use MUSTs do not require daily inspections based on current and future system configuration.
4.3.2(B)(2)	When in use, mission essential MUSTs shall receive the following **inspections daily**, and have the results documented in the facility operating record: (a) Inspect overfill/spill control equipment to ensure good working order; (b) Inspect aboveground portions of the system to detect corrosion or releases; (c) Gather data monitoring and leak detection equipment to ensure tank systems operate according to design; and (d) Inspect construction materials and the surrounding area to detect erosion or signs of releases.	WAC 173-303-400; 40 CFR 265.195(a)
4.3.2(C)	Vessels and cells in miscellaneous structures shall receive inspections in accordance with tank farm procedures	Tank farm procedures.
4.3.2(D)(1)	Inactive/not-in-use at-tank and between-tank pits **shall not require daily inspections**.	Inactive/not-in-use at-tank and between-tank pits are not actively involved in the conveyance of waste and have been or will be physically isolated from the in-use transfer system. Therefore, at-tank and between-tank pits do not require daily inspection based on current and future system configuration.
4.3.2(D)(2)	When in use, mission essential at-tank and between-tank pits will receive the following **inspections daily**, and have the results documented in the facility operating record: (a) Inspect overfill/spill control equipment to ensure good working order; (b) Inspect	WAC 173-303-400; 40 CFR 265.195(a)

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
	aboveground portions of the system to detect corrosion or releases; (c) Gather data from monitoring and leak detection equipment to ensure tank systems operate according to design; and (d) Inspect construction materials and the surrounding area to detect erosion or signs of releases.	
4.3.2(E)(1)	Inactive/not-in-use piping **shall not require daily inspections.**	The 200 East and 200 West Areas contain extensive networks of piping including approximately 1,300 individual transfer lines. The inactive/not-in-use piping has been isolated from the in-use transfer systems. These inactive/not-in-use transfer lines contain a variety of piping configurations including single-walled direct buried, concrete encased, double-wall buried, and aboveground hose-in-hose. Typically, transfer piping was designed to self-drain to pits and pits to drain to MUSTs. In addition, line flushes occurred throughout the transfer campaigns at regular intervals and at the completion of the campaign removing a majority of the constituents of concern from the transfer line. Therefore, inactive/not-in-use piping does not require daily inspection based on current and future system configuration.
4.3.2(E)(2)	When in use, mission essential piping will receive the following **daily inspections**, and have the results documented in the facility operating record: (a) Inspect overfill/spill control equipment to ensure good working order; (b) Inspect aboveground portions of the system to detect corrosion or releases; (c) Gather data from monitoring and leak detection equipment to ensure tank systems operate according to design; (d) Inspect construction materials and the surrounding area to detect erosion or signs of releases	WAC 173-303-400; 40 CFR 265.195(a)
4.3.3(A)(1)	Perform repairs on leaking and not in service tank systems prior to returning them to service. Report any release to the environment to Ecology within 24 hours of its detection unless the hazardous waste leak or spill is less than or equal to one pound and immediately contained and cleaned-up. File notification reports satisfying the requirements of WAC 173-303-400 and 40 CFR 265.196(d)(3) within 30 days of the detection of a release to the	WAC 173-303-400; 40 CFR 265.196(d)

Table B-2. Summary of Leak Detection Requirements and Bases (12 Sheets)

Ref.	Requirement	Basis
	environment.	
4.3.3(A)(2)	Retrieve SST system waste in accordance with HFFACO Milestone M-45-00.	HFFACO Milestone M-45-00.
4.4(A)	New structures, systems and components added to the SST system shall have secondary containment in accordance with WAC 173-303-400 and 40 CFR 265.193.	WAC 173-303-400; 40 CFR 265.193

BMP = best management practice
CFR = *Code of Federal Regulations*
DOE = U.S. Department of Energy
Ecology = Washington State Department of Ecology
HFFACO = *Hanford Federal Facility Agreement and Consent Order*
LDM = leak detection and monitoring
MUST = miscellaneous underground storage tank
SST = single-shell tank
WAC = *Washington Administrative Code*

B3.3 SINGLE-SHELL TANKS

Based on the requirements for LDM identified in Section 4.0 of the main text and the BMPs identified in Section 5.0, the SSTs are grouped into four groups of tanks. The first group of SSTs are tanks that are technically practical to monitor for leak losses and that do not meet the interim stabilization criteria or that meet interim stabilization criteria and intrusion prevention has not been completed. These tanks are leak detection monitored based on the requirements identified in Section 4.0. The tanks included in this group are listed in Table B-3.

Table B-3. Summary of Leak Detection Requirements and Bases (8 Sheets)

241-A-103
241-BX-103
241-BY-103
241-C-102
241-T-102
241-T-112

The second group of SSTs consists of tanks that are technically practical to monitor for leak losses, have been interim stabilized with drainable interstitial liquid >40K gallons and intrusion prevention has not been completed., These tanks are periodically monitored (weekly) based on the BMPs identified in Section 5.0 of the main text using currently available monitoring systems. The tanks included in this group are listed in Table B-4.

Table B-4. Single-Shell Tanks With >40K Drainable Interstitial Liquid and Without Intrusion Prevention

None	

The third group of tanks consists of SSTs that are technically practical to monitor for leak losses, have been interim stabilized and meet the interim stabilization criteria, intrusion prevention has been completed, and have suspect integrity. It also includes SSTs that have waste characteristics that make it technically unfeasible to detect leaks, and have suspect integrity. Tanks technically unfeasible to leak detect have dry waste surfaces, and drainable liquid levels less than 24 inches. Suspect integrity is defined as any tank that has been previously declared a known or assumed leaker or is identified in RPP-10435 as having stored boiling waste or having a bulge (tanks in the A, AX, SX tank farms). Table B-5 identifies the tanks that fall into this grouping. These tanks are periodically monitored (at least annually) based on the BMPs identified in Section 5.0 of the main text using currently available monitoring systems supplemented by scheduled visual photographic inspections. The basis for annual monitoring derives from documented past intrusion events and the fact that these tanks are known or suspected leakers or have integrity issues.

Table B-5. Single-Shell Tanks with Suspect Integrity Requiring Periodic Monitoring

241-A-102	241-BX-101	241-S-105	241-TX-107
241-A-103	241-B-201	241-SX-108	241-BY-108
241-A-104	241-BX-102	241-SX-109	241-TX-110
241-A-105	241-BX-108	241-SX-110	241-TX-113
241-A-106	241-BX-110	241-SX-111	241-TX-115
241-AX-102	241-BX-111	241-SX-112	241-TX-116
241-AX-103	241-BY-107	241-SX-113	241-TX-117
241-AX-104	241-C-101	241-SX-114	241-TY-101
241-B-101	241-C-110	241-SX-115	241-TY-103
241-B-103	241-C-111	241-T-101	241-TY-104
241-B-105	241-C-201	241-T-103	241-TY-105
241-B-107	241-C-202	241-T-106	241-TY-106
241-B-110	241-C-203	241-T-107	241-U-101
241-B-111	241-C-204	241-T-108	241-U-104
241-B-112	241-S-104	241-T-109	241-U-110
241-B-203	241-SX-106	241-T-111	241-U-112
241-B-204	241-SX-107	241-TX-105	241-BY-103
241-BY-105	241-BY-106	241-SX-104	

The final group of tanks consists of SSTs are technically practical to monitor for leak losses, have been interim stabilized and meet the interim stabilization criteria, intrusion prevention has been completed, and do not have suspect integrity or waste retrieval, as agreed to by Ecology and the Office of River Protection, has been completed. It also includes SSTs that have waste characteristics that make it technically unfeasible to detect leaks, and do not have suspect integrity. The tanks in this group are listed in Table B-6. These tanks are monitored (at least annually) for liquid intrusions based on the BMPs identified in Section 5.0 of the main text using currently available intrusion monitoring system supplemented by scheduled visual photographic inspections. The basis for annual intrusion monitoring is derived from documented past intrusion events and the fact that these tanks are sound tanks with no known suspect integrity issues. Of the four known or potential intrusion events into tanks previously interim stabilized, the average intrusion rate has been approximately 1,000 gallons per year.

Table B-6. Single-Shell Tanks Requiring Intrusion Monitoring

241-B-102	241-BY-101	241-S-110	241-TX-111
241-B-104	241-BY-110	241-T-104	241-TX-112
241-B-106	241-BY-111	241-T-105	241-TX-118
241-B-108	241-BY-112	241-T-202	241-TY-102
241-B-109	241-C-104	241-T-203	241-U-103
241-B-202	241-C-105	241-T-204	241-U-201
241-BX-104	241-C-108	241-TX-101	241-U-202
241-BX-106	241-C-109	241-TX-103	241-U-203
241-BX-107	241-C-112	241-TX-104	241-U-204
241-BX-109	241-AX-101	241-TX-108	241-A-101
241-BX-112	241-S-108	241-TX-109	241-BX-103
241-BX-105	241-BY-104	241-BY-109	241-C-102
241-C-103	241-C-106	241-C-107	241-S-106
241-S-102	241-S-109	241-S-111	241-S-112
241-SX-102	241-SX-105	241-T-102	241-T-112
241-T-201	241-TX-102	241-TX-106	241-TX-114
241-U-102	241-U-106	241-U-107	241-U-111
241-U-105	241-U-108	241-U-109	241-BY-102
241-S-101	241-S-103	241-S-107	241-S-111
241-SX-101	241-SX-103	241-T-110	

B3.4 MUSTS AND VESSELS AND CELLS IN MISCELLANEOUS STRUCTURES

Based on the requirements for LDM identified in Section 4.0 of the main text, the MUSTs, vessels and cells are grouped into three groups. The first group consists of seven vessels and cells and nine MUSTs that store a known liquid volume that exceeds the interim stabilization

criteria (400 gallons). These vessels and MUSTs are leak detection monitored based on the requirements identified in Section 4.0. Table B-7 identifies the vessels in this group.

Table B-7: MUSTs, Vessels, and Cells Requiring Leak Detection Monitoring

244-CR Cell 2	244-CR-CR-003
244-CR Cell 3	244-CR Cell 11
244-CR-001	244-CR-002
244-CR-011	244-A
241-AZ-151	244-S
241-EW-151	244-BX
241-U-301B	244-TX
241-A-302A	241-A-350

The second group consists of vessels, cells and MUSTs that have liquid volumes that meet the interim stabilization criteria (e.g., less than 400 gallons of drainable liquids) or are known to be empty. This group contains ten vessels, cells, and seven MUSTs. These vessels are monitored (at least annually) for liquid intrusions. Table B-8 identifies the vessels in this group.

Table B-8 MUSTs, Vessels, and Cells Requiring Annual Intrusion Monitoring

244-AR Cell 1	244-AR TK-004
244-AR Cell 2	244-AR TK-002
244-AR Cell 3	244-AR TK-003
244-AR TK-001	241-ER-311
241-TX-302C	241-UX-302A
241-AX-152	241-S-304
241-A-417[1]	241-AZ-154
244-CR Cell 1	241-AX Ion Exchange
241-BY-ITS1	244-U[2]

[1]Annual monitoring of 241-A-417 was established in 2003 by letter DOE Office of River Protection 03-TOD-073

[2]244-U was never placed in service and did not receive dangerous waste

The third group consists of MUSTs, vessels, and cells that cannot be monitored due to the long-term absence of monitoring instrumentation. The MUSTs, vessels, and cells in this group were assessed under Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestone M-23-26. Table B-9 identifies MUSTs, vessels, and cells in this group

Table B-9 MUSTs, Vessels, and Cells that Cannot Be Monitored	
241-AX-151-CT	241-BY-ITS2 Tank 2

This page intentionally left blank.

B4.0 REFERENCES

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

CHG-0007065-R2, 2001, *Evaluation of 120 SSTs That Have Been Interim Stabilized*, CH2M HILL Hanford Group, Inc., Richland, Washington.

CT-99-5076-EFS, 1999, Consent Decree between the State of Washington, Department of Energy (Plaintiff), and the United States Department of Energy (Defendant), August 16, 1999.

DOE/RL-89-16, *Single-Shell Tank Closure Work Plan*, Rev. 1, May 1996, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Richland, Washington.

HNF-EP-0182, Rev. 219, *Waste Tank Summary Report for Month Ending June 30, 2006*, CH2M HILL Hanford Group, Inc., Richland, Washington.

TFC-ENG-CHEM-P-15, Single-Shell Tank *Interim Stabilization Evaluation*, CH2M HILL Hanford Group, Inc., Richland, Washington.

TFC-ENG-FACSUP-P-03, *Tank Farm Facility Intrusion Prevention*, CH2M HILL Hanford Group, Inc., Richland, Washington.

Public Law 101-510, Section 3137, 1990, *Safety Measures for Waste Tanks at Hanford Nuclear Reservation*, U.S. Congress, Washington, D.C. [Also referred to as the Wyden Amendment.]

Resource Conservation and Recovery Act of 1976, Public Law 94-580, 90 Stat. 2795, 42 USC 901 et seq.

RPP-7884, 2001, *Field Investigation Report for Waste Management Area S-SX*, Draft, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-9645, 2002, *Single-Shell Tank System Surveillance and Monitoring Program*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

RPP-10435, 2002, *Single-Shell Tank System Integrity Assessment Report*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

WHC-EP-0182, Rev. 79, *Waste Tank Summary for Month Ending October 31, 1994*, Westinghouse Hanford Company, Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

This page intentionally left blank.

APPENDIX C
COST ANALYSIS

This page intentionally left blank.

APPENDIX C

COST ANALYSIS

This appendix provides rough order of magnitude budgetary estimates to accomplish the leak detection and monitoring system and programmatic upgrades needed to achieve compliance with the requirements established by this document.

All single-shell tank system components requiring leak detection and monitoring are specified in Appendix A. Appendix A lists the single-shell tanks, miscellaneous underground storage tanks, and vessels and cells in miscellaneous structures that require leak detection and monitoring as defined by this document.

Maintenance and surveillance costs are not included due to high variability based on the application. Costs associated with procedure changes due to leak detection and monitoring requirement changes are not included since costs will vary based on whether non-related changes are being incorporated into the subject procedures at the time.

Liquid Volume Assessment Cost Estimate

Activity ID	Activity	Cost ($)	Labor (hours)	Labor Category & Rates ($/hr)								
				Field Work Supervisor	Nuclear Process Operator	Radiation Protection Technician	Pipefitter	Camera Crew	Engineering	Planner	Radiation Control	Industrial Safety
				80	**55**	**65**	**55**	**55**	**70**	**65**	**70**	**40**
01	Perform Field Walkdown	820.00	12	4	4	--	--	--	4	--	--	--
02	Prepare Fieldwork Installation Package	3,880.00	56	--	--	--	--	--	8	40	8	4
03	Prepare Radiation Work Permit	2,800.00	40	--	--	--	--	--	--	--	40	--
04	Hold Enhanced Work Planning Meeting	3,100.00	48	4	8	4	8	12	4	4	4	4
05	Revise and Approve Work Package	1,040.00	14	2	--	--	--	--	2	8	2	2
06	Field Work Preparation	3,240.00	48	8	16	8	16	--	--	--	--	8
07	Perform Manual Tape Measurement / Video Inspection	4,460.00	68	8	16	8	16	12	8	--	--	8
08	Restore Field Conditions	1,620.00	24	4	8	4	8	--	--	--	--	4
					--							
	Sub total	20,960.00	310	30	52	24	48	24	26	52	54	30
	Contingency @ 30%	6,288.00					--					
	Total	**27,248.00**					--					

Assumptions: (1) Tanks readily accessible through available risers.
(2) Adequate liquid volume estimates can be made with manual tape and video data.

APPENDIX D
SCHEDULE ANALYSIS

This page intentionally left blank.

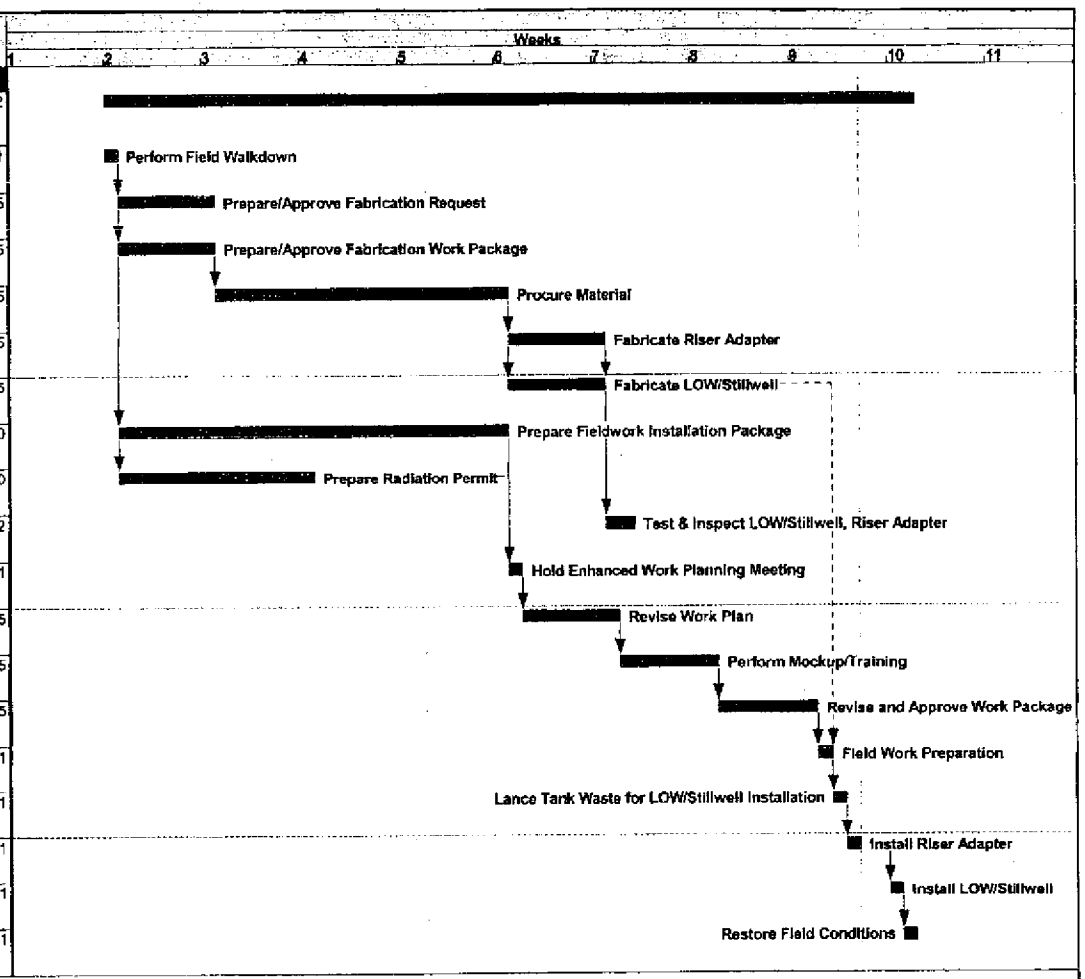
APPENDIX D

SCHEDULE ANALYSIS

This appendix provides rough order of magnitude schedule estimates to accomplish the leak detection and monitoring system and programmatic upgrades needed to achieve compliance with the requirements established by this document. This schedule shows estimated durations to perform upgrades, but does not establish actual dates to accomplish the work.

All single-shell tank system components requiring leak detection and monitoring are specified in Appendix A. Appendix A lists the single-shell tanks, miscellaneous underground storage tanks, and vessels and cells in miscellaneous structures that require leak detection and monitoring as defined by this document.

Activity ID	Activity Description	Orig Dur.
Liquid Observation Well/Stillwell		
Total		42
01	Perform Field Walkdown	1
02	Prepare/Approve Fabrication Request	5
03	Prepare/Approve Fabrication Work Package	5
04	Procure Material	15
05	Fabricate Riser Adapter	5
06	Fabricate LOW/Stillwell	5
07	Prepare Fieldwork Installation Package	20
08	Prepare Radiation Permit	10
09	Test & Inspect LOW/Stillwell, Riser Adapter	2
10	Hold Enhanced Work Planning Meeting	1
11	Revise Work Plan	5
12	Perform Mockup/Training	5
13	Revise and Approve Work Package	5
14	Field Work Preparation	1
15	Lance Tank Waste for LOW/Stillwell Installation	1
16	Install Riser Adapter	1
17	Install LOW/Stillwell	1
18	Restore Field Conditions	1



JP01

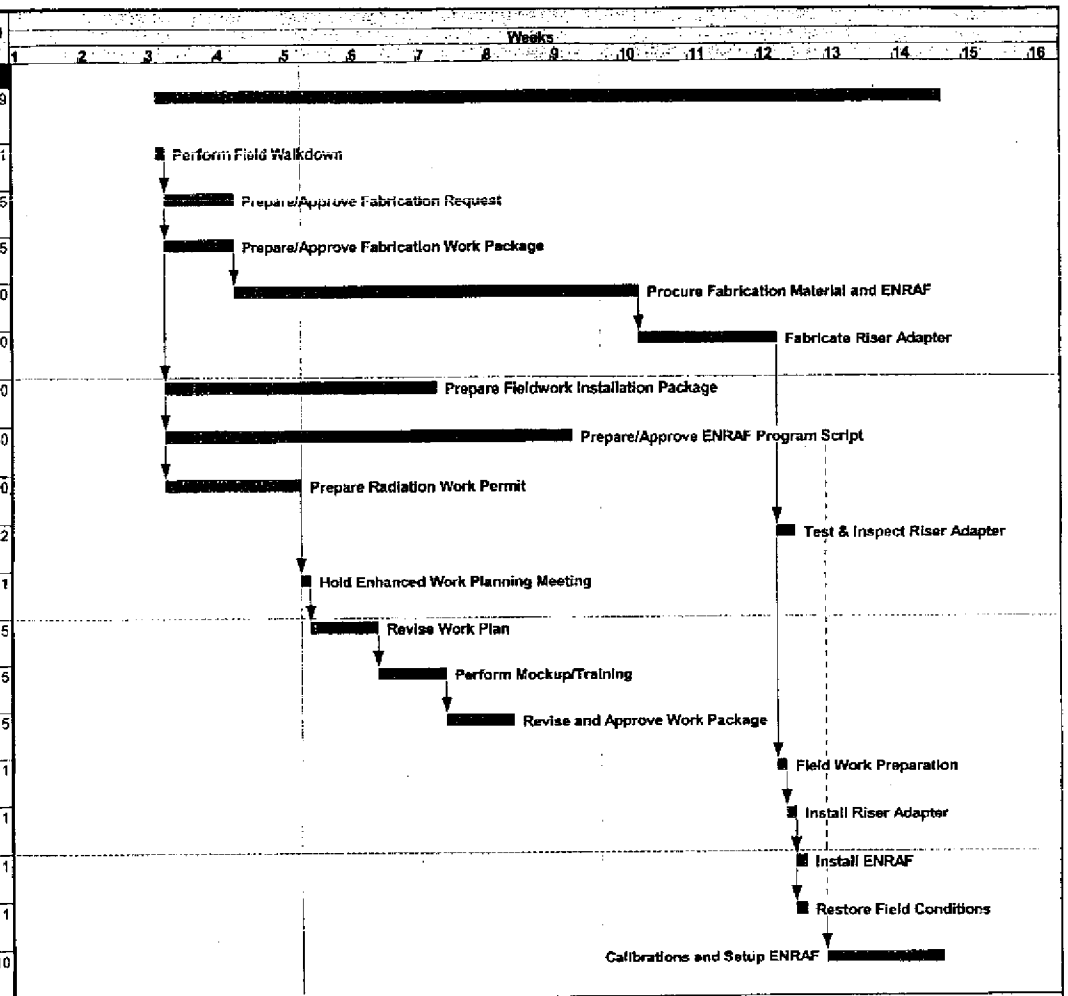
Sheet 1 of 1

Liquid Observation Well/Stillwell
Draft Schedule

Early Bar
Progress Bar
Critical Activity

© Primavera Systems, Inc.

Activity ID	Activity Description	Orig Dur
ENRAF		
Total		59
01	Perform Field Walkdown	1
02	Prepare/Approve Fabrication Request	5
03	Prepare/Approve Fabrication Work Package	5
04	Procure Fabrication Material and ENRAF	30
05	Fabricate Riser Adapter	10
06	Prepare Fieldwork Installation Package	20
07	Prepare/Approve ENRAF Program Script	30
08	Prepare Radiation Work Permit	10
09	Test & Inspect Riser Adapter	2
10	Hold Enhanced Work Planning Meeting	1
11	Revise Work Plan	5
12	Perform Mockup/Training	5
13	Revise and Approve Work Package	5
14	Field Work Preparation	1
15	Install Riser Adapter	1
16	Install ENRAF	1
17	Restore Field Conditions	1
18	Calibrations and Setup ENRAF	10



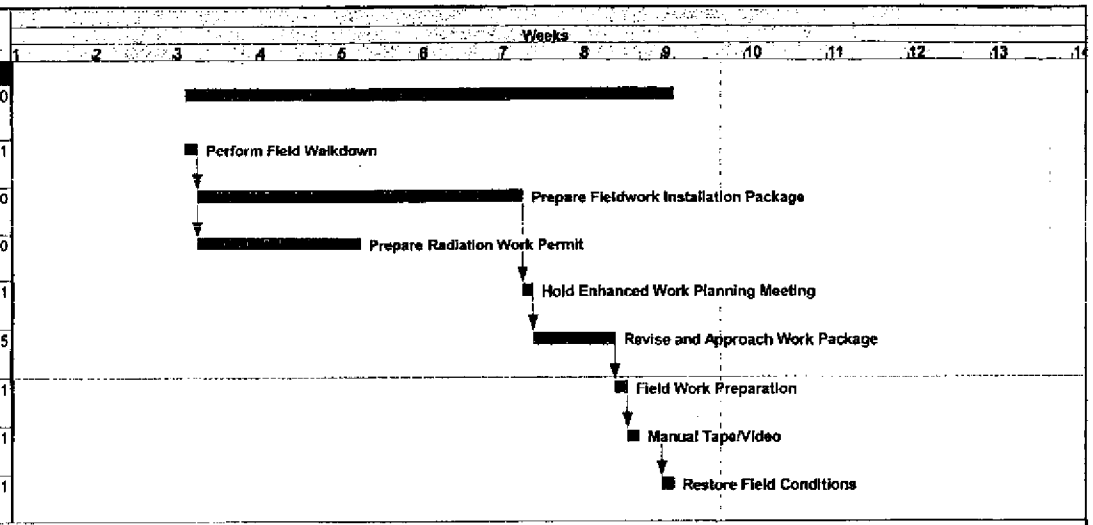
JP02 Sheet 1 of 1

ENRAF
Draft Schedule

Early Bar
Progress Bar
Critical Activity

© Primavera Systems, Inc.

Activity ID	Activity Description	Orig Dur
Must/Tanks in Misc. Structures		
Total		30
01	Perform Field Walkdown	1
02	Prepare Fieldwork Installation Package	20
03	Prepare Radiation Work Permit	10
04	Hold Enhanced Work Planning Meeting	1
05	Revise and Approach Work Package	5
06	Field Work Preparation	1
07	Manual Tape/Video	1
08	Restore Field Conditions	1



JP03

Sheet 1 of 1

MUST/TANKS IN MISC STRUCTURES
Draft Schedules

Early Bar
Progress Bar
Critical Activity

© Primavera Systems, Inc.

08-TOD-027

Enclosure 2

ECOLOGY REVIEW COMMENT RECORD (RCR)

Consisting of 8 pages including coversheet

REVIEW COMMENT RECORD (RCR)

1. Date 6-7-07	2. Review No.
3. Project No.	4. Page

5. Document Number(s)/Title(s)	Project Manager Name	Reviewer Names:		
SSTs F&R RPP-9937 Rev. 3		Nancy Uzeimblo Les Fort Jean Vanni Michelle Mandis		

	10. Agreement with indicated comment disposition(s)	
Organization Manager (Optional)	Reviewer/Point of Contract Date Author/Originator	Reviewer/Point of Contact Date Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
1.	General: This document was developed in response to TPA Milestone M-23-23. What has been and/or now assumed to be the protocols associated with acceptance of the document?		This document was developed as a TPA primary document per the requirements of HFFACO Milestone M-23-23. Update, review, and approval of the primary document is done per Section 9.2.1 of the HFFACO.	Closed
2.	General: The equipment and tanks listed in this document do not agree with the list of equipment and tanks listed in the Part A and the WIDS database. Please verify this list with the Part A and the WIDS database and add the missing components to either the Part A, WIDS database and/or this document.		Equipment lists have been reviewed. Review ended up adding 2 tanks and 120 transfer lines to the F&R listing. This information will be included in the official submittal	Closed
3.	General: Provide the criteria for choosing or changing the type of leak detection and monitoring device as presented in this document.		The criteria for assigning leak detection or best management practice intrusion detection is contained in Chapter 4 and 5 of RPP-9937. These chapters provide the frequency and method for the	Closed

REVIEW COMMENT RECORD (RCR)

1. Date 7-15-03	2. Review No.
3. Project No. N/A	4. Page 2 of 7

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
			single-shell tanks, miscellaneous underground storage tanks, vessels within cells and vaults, transfer lines, and pits. Chapter 4 also sets the frequency for the above ground inspection of tank systems. HFFACO Milestone M-23-25 required the installation of Liquid Observation Wells (LOW) in selected tanks. Operations Specification Document OSD-T-151-00031, Operating Specifications For Tank Farm Leak Detection and Single-Shell Tank Intrusion Detection, implements the requirements of RPP-9937. The monitoring instrument for each tank is selected based on the surface condition in each tank (liquid pool, damp surface, dry surface, interstitial liquid) consistent with the installation of LOWs under M-23-25. The instrument used for each tank is also listed in RPP-9937, Appendix B, Table B-2,	
4.	General: Changes have been (additions & deletions) made without explanation or Ecology approval and text in document doesn't correlate with what is presented in Appendix A. Please review & reconcile these two documents, and provide rationale for changes.		Disagree that Appendix A and Chapters 4 and 5 do not correlate. If there are instances of non-correlation, could they be provided please so they can be corrected? It should be noted that the F&R has not been submitted for Ecology approval yet. This is an early draft for comment so the formal submittal will be something that all parties agree on.	Closed
5.	General: Table 4-1: Reformat table as follows: Include all components of the SST System **Table 4-1. Component Groups and Requirements** System | F & R | Type of | Frequency | Requireme		A table titled "Single-Shell Tank System Leak detection and Monitoring Requirements was submitted for Ecology review. Ecology has stated that the table is good and it will be included in the	Closed

REVIEW COMMENT RECORD (RCR)

1. Date 7-15-03	2. Review No.
3. Project No. N/A	4. Page 3 of 7

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
	Equipment Descriptio n | Group | Leak Detection Equipment | of Inspection | nts Reference		document.	
6.	General: Explain how leak detection is conducted in flush pits.		Per RPP-9937 Appendix A and B, there are no flush pits listed for the SST system therefore, there are no leak detection requirements. In addition, the raw water supply to the tank farms has been secured to prevent raw water leaks within the farms.	Closed
7.	General: Provide more detail on the schedule visual photographic inspections and what is determined in this inspection. Where is this stated?		The reference to a visual photographic inspection has been modified to indicate that the photographic inspection will be done on an as needed basis. Use of the term "scheduled" has been deleted.	Closed
8.	General: RE: 244-CR vault. Is it implied that the tanks, other than 244-TK-CR-003, in the vault are not monitored for leaks. Provide explanation. Give reference in document.		Table B-8 clearly shows that leak detection is required for 244-CR vault cells 2, 3, and 11 and tanks 001, 002, 003, and 011. The leak detection is required due to liquid assessment performed under HFFACO Milestone M-23-26. That assessment determined that liquid was present in these cells and tanks. The level instruments for the cells and tanks 001, 002, and 011 will be installed by September 30, 2008. The liquid assessment determined that cell 1 was empty and cell 1 is, therefore, listed on Table B-9.	Closed
9.	General: Explain how LDM presented in this document coordinates with the HIHTL leak detection efforts.		The scope is limited to pre- and post-retrieval. The HIHTLs are used during retrieval. The leak detection requirement for the HIHTL is set by the individual SST Tank Waste Retrieval Work Plan	Closed

REVIEW COMMENT RECORD (RCR)

1. Date 7-15-03	2. Review No.
3. Project No. N/A	4. Page 4 of 7

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
			(TWRWP).	
10	General: Clarify what is meant by 'mission essential' and provide rationale for defining what is meant by this term and to what components it applies.		The RPP-9937 Definitions section on Page xx provides the definition as "Mission Essential: Those systems, components, and structures where it would be typical for waste to be moved in and out of the system to meet a current or expected mission." Appendix A, starting on Page A-2 provides the listing of Mission Essential Components.	Closed
11	General: Provide documentation to support determinations of a component no longer having 'suspect integrity.' Where stated in document?		RPP-9937 does not include guidance on determining if a component no longer has suspect integrity. Rather, the RPP-9937 contains monitoring requirements for the components that have been determined to have suspect integrity. There is no method under the RPP to re-address the integrity determination of a tank or component. RPP-9937 Revision 3 Table B-6 (Revision 2 Table B-7) lists the SSTs with suspect integrity. RPP-10435, Single-Shell Tank System Integrity Assessment Report is listed in Section B4.0 and contains the assessment of the integrity of each SST. RPP-10435 was prepared and submitted to Ecology per the requirements of HFFACO Milestone M-23-24. Per Section 5.2.1, "A tank is deemed to have suspect integrity if it has been previously declared a know or assumed leaker (HNF-EP-0182, Rev. 173) or was identified in RPP-10435, *Single-Shell Tank System Integrity*	Closed

REVIEW COMMENT RECORD (RCR)

1. Date 7-15-03	2. Review No.
3. Project No. N/A	4. Page 5 of 7

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
			Assessment Report as having a bulge or having stored boiling waste."	
12	General: Noted through-out the document: The requirement to "Mitigate the effects of the leak as soon as possible" does not correlate with the function to "Contain the leak". Revise text.		Agreed. This verbiage will be changed to "contain the leak."	Closed
13	Page 3-2, fourth bullet and through-out the document Change "Tributyl phosphate process" to the "Uranium Recovery Process (URP)" to use correct Hanford process terminology consistent with other processes listed. Why?		Disagree. Tributyl phosphate process is the term used to describe the process in the SST Part A.	Closed
14	Page 3-5, section 3.1.1 Strike the last sentence, "No additional confirmation or declaration of leakers has occurred since 1994." This statement is mis-leading as other tanks have leaked. Also, Ecology does not agree with the information presented in the references listed.		Sentence will be deleted.	Closed
15	General Section 4.1.1 The Basis and criteria for monitoring are skewed. ORP/CHG should ensure all tanks do not receive liquid from intrusion, monitor weekly or annually for it in SSTs. Regardless if emergency pumping equipment fit into a MUST, the MUSTs should be monitored, intrusion prevented, and retrieved, as necessary.		The catch tanks and DCRTs added to the F&R were stabilized and isolated to meet Milestone M-48-07 criteria. Ecology acknowledged, by letter, the completion of the M-48-07 activity. The scope is limited to pre- and post-retrieval (could be viewed as pre-closure) periods. The SST monitoring requirements are established as annual for intrusion monitoring or as quarterly (for 5 tanks) for leak detection. All SSTs have been sealed for intrusion monitoring in accordance with TFC-ENG-FACSUP-P-03, Tank Farm Facility Intrusion Prevention.	Closed
16	Page 5-4, section 5.2.1 Provide the location of the listing of first through fourth groupings of SSTs.		The actual listings of SSTs in each grouping are contained in Tables B-4, B-5, B-6, and B-7 of Appendix B. "(Refer to Table B-XX)" has been	Closed

REVIEW COMMENT RECORD (RCR)

1. Date 7-15-03	2. Review No.
3. Project No. N/A	4. Page 6 of 7

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
			added to the grouping discussion in Section 5.2.1. A summary table has been incorporated into the document.	
17	Page B-1, second paragraph While ORP has made effort over the past 25 years to mitigate the risks posed by the SST system, "significantly mitigate" is a matter of opinion only. Strike "significantly".		The word "significantly" will be removed	Closed
18	Page B-4, Table B-1 Add a References column for each row that will demonstrate how current the information is presented in the table. Also zero gallons of waste are reported for At-Tank Pits, Between-Tank Pits, and Transfer Lines. Unless the components have been thoroughly investigate change the entry from "zero" to "unknown" and provide a schedule for the investigation of these components.		This table will be removed. The characterization of the ancillary equipment (pits and transfer lines) will occur under the SST closure permit. Such investigative work is outside the scope of RPP-9937.	Closed
19	Page B-5, sixth paragraph, delete "sixteen" in the first sentence and replace with "seventeen" system MUSTs to maintain consistency through-out the document. And provide information regarding the remaining 10 MUSTs.		The list of MUSTs was reviewed and compared to the SST Part A and modified to match the SST Part A listing. The revisions will be in the final document	Closed
20	Page B-6, first bullet Provide information regarding the continuance of replacing drywell caps when they are damaged.		Yes, the drywell caps will be replaced when they are damaged.	Closed
21	Page B-6, bullets Add another bullet that discusses the T-106 Interim Surface Barrier Demonstration as an action to limit the amount of surface water infiltrating into the tank farm.		Since the T-106 Interim Surface Barrier is just beginning construction, it will not be added to this revision. However, it will be added to future revisions once the construction phase is complete	Closed
22	General: This document is attempting to fulfill requirements to provide functions and requirements for a leak detection and monitoring system for the SST System and, it appears to also serve the purposes of a Workplan. As currently structured, document intent is difficult to understand. Ecology suggests changing the		The F&R provides the requirements with Appendix A and B supporting chapters 4 and 5. The requirements are implemented through OSD-031. During the negotiations for the milestone, this was the agreed to approach. This comment is asking for	Closed

REVIEW COMMENT RECORD (RCR)

1. Date 7-15-03	2. Review No.
3. Project No. N/A	4. Page 7 of 7

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Reviewer Concurrence Required	15. Disposition (Provide justification if NOT accepted.)	16. Status
	format as follows: 1st half of the document identifies the functions and requirements for leak detection and monitoring of the extended SST System as it currently exists, and keeping in mind that the system will be required to closure under final status WAC 173-303-610 requirements. 2nd half of the document is a detailed Workplan to implement these F&Rs.		the OSD-31 implementation piece to be rolled into the F&R. This goes against the position established during Milestone development, negotiation, approval, and incorporation.	

Task# ORP-TOD-2008-0032

E-STARS[R] Report
Task Detail Report
03/12/2008 1129

TASK INFORMATION

Task#	ORP-TOD-2008-0032		
Subject	Concur 08-TOD-027 Submittal of RPP-9937, Revision 3 to Single-Shell Tank System Leak Detection and Monitoring Functions and Requirement Document		
Parent Task#		**Status**	Open
Reference		**Due**	
Originator	Tobias, Shannon (Tobias, Shannon)	**Priority**	High
Originator Phone	(509) 372-1382	**Category**	None
Origination Date	03/12/2008 1119	**Generic1**	
Remote Task#		**Generic2**	
Deliverable	None	**Generic3**	
Class	Long Term	**View Permissions**	Normal
Instructions	bcc: TOD OFF File TOD RDG File MGR RDG File H. N. Taylor, DEP MGR D. L. Noyes, TF M. C. Brown, TOD J. D. Long, TOD S. J. Olinger, MGR SES		

ROUTING LISTS

1 Route List Active

- Long, John D - Review - Awaiting Response - Due Date
  Instructions: JDL 3/12/08
- Brown, Mark C - Review - Awaiting Response - Due Date
  Instructions: MCB 3/12/08
- Noyes, Delmar L - Review - Awaiting Response - Due Date
  Instructions: MCB for 3/17/08
- Taylor, Hugh N - Review - Awaiting Response - Due Date
  Instructions: HNT 3/18/08
- Olinger, Shirley J - Approve - Awaiting Response - Due Date
  Instructions: T.E.O. 3/21/08 SJO 3/25/08

ATTACHMENTS

Attachments 1. 08-TOD-027.jl.hedgesl.doc

COLLABORATION

COMMENTS

RECEIVED
MAR 25 2008
DOE-ORP/ORPCC

Task# ORP-TOD-2008-0032

No Comments

TASK DUE DATE HISTORY

No Due Date History

SUB TASK HISTORY

No Subtasks

-- end of report --